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Psoriasis Treated Roentgenologically*

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MR. President and Fellow Radiologists and Physiotherapists:

1. In presenting for your consideration the subject of *Psoriasis Treated Roentgenologically,* the writer is fully cognizant of the fact that at its best we are dealing with a dry and scaly condition; one that would require the consummate skill of a literary genius to make it of passing interest even to the medical profession. Its obnoxious feature is not so much its appearance or the difficulty of diagnosis, but rather the stubbornness toward ordinary treatment and its apparent habit of playing peek-a-boo at stated intervals. Until of late it might be properly classed with that ode of Osler wherein he advises us to "take to the back fence rather than risk our reputation treating some forms of disease."

2. Some twenty years ago, through the influence of the text book, *The Roentgen Rays in Therapeutics and Diagnosis,* compiled by Pusey and Caldwell, my curiosity as to the possibilities and value of x ray application in dermatological lesions was aroused; as time demonstrated some improvement of the pathological symptoms after careful and safe administration of the rays, this curiosity became enthusiasm. It is possible that a satisfactory explanation of "sticktuitiveness" in treating the different types of skin lesions may be had by considering that residence in a small city for several years acquaints us with a majority of the inhabitants and through daily contact we observe the sufferers from such maladies. This becomes decidedly true when we are engaged in general practice, as has been my own experience. There exists no necessity of describing to you the symptomatology, differential diagnosis, complications or sequellae of this repellant disease; yet, in the presentation of the five case reports selected, each has some interesting feature, to me at least, and may serve to duplicate some of your own findings and results.

*Read before the American College of Radiology and Physiotherapy, Nov. 13, 1924.

CASE REPORTS

CASE NO. 1: John A. Race, Caucasian; Type, Blonde; Height, 68 inches; Weight, 150 pounds; Present Age, fifty-three; Occupation, laborer and trapper.

Family History: Negative.

Complaint and Development: Period of onset, spring of 1911. First noticed a lesion upon the right buttock about the size of the hand. Medical advice and treatment were obtained, which relieved the symptoms, but did not cause a disappearance of the eruption. In August of the same year, while working in a gravel pit, he became overheated and within thirty-six hours the body was completely covered with reddened blotches, which soon took on the characteristics of typical psoriasis. Medical, dietary and hospital treatment alleviated the accompanying irritation for awhile, but recovery seemed impossible of attainment.

General Examination: First examined at my office Dec. 20th, 1922. At this time it was necessary to spread newspapers upon the floor to catch the snowstorm of scales; the skin had become so indurated over the entire body, including the genitals, that it felt pachydermatous and gave a true picture of dermatitis exfoliotiva as a complication; the face showed lineations resembling a telangiectasis and the nervous system was so involved from the long period of suffering that the patient had threatened suicide. He had been unable to work for months.

Progress and Treatment: Treatment began on Dec. 20, 1922, and continued to June, 1924, as follows: Six in Dec., 1922; 75 in the year 1923; 1 in Jan., 1924; 1 in Feb., 1924; 1 in May,

1924. Total number of treatments to date, 84.

At my request he visited me in the last week of October, at which time he was free from all symptoms and lesions; the skin has softened and whitened nearly to normal and for the past year he has performed daily labor of the most strenuous type—that of laying concrete sidewalks. He fully understands that he is yet under observation and has been admonished to return for examination at stated intervals or at once, provided there appears a single papule.

CASE NO. 2: Frank B. Race, Caucasian; Type, Blonde; Height, 67 inches; Weight, 235 pounds; Present age, sixty; Occupation, butcher.

Family History: Negative.

Complaint and Development: Period of onset, 1916. First noticed as isolated lesions upon the scalp, followed by an outbreak upon the chest, back, elbows, perineum, thighs and legs. The usual medical treatment and diet gave some relief, but drug store prescriptions, netting 180 pounds of ointments over a course of three years, did not effect a cure.

General Examination: Examination at office May 9th, 1923. Scalp indurated with lesions coalescent, involving postauricular and cervical sites; several large patches upon upper back, smaller ones upon right abdomen and a single one upon outer aspect of left leg; perineal integument inflammatory with genitals unaffected; itching confined to perineum and upper inner surface of thighs.

Progress and Treatment: Treatment began May 9, 1923, and continued intermittently to the present. During August, September and October, 1924, but five treatments were given, all of these being confined to the head area, where the disease first made itself manifest. In this month the patient has received two treatments thus far, one upon the scalp, the other upon the upper back and a recurrent small lesion upon the abdomen. The perineal region has been free from lesions since June, which is somewhat remarkable, since the patient is very fleshy and chaffing during the hotter months could not be avoided.

CASE NO. 3: Tom G. Race, Caucasian; Type, Blonde; Height, 69 inches; Weight, 150 pounds; Present age, fifty; Occupation, yard switchman.

Family History: Negative.

Complaint and Development: Period of onset of psoriasis unknown. Twenty-five years ago there was a severe attack of Eczema Erythematosum Cutis confined to the face and accompanied by very pronounced oozing. Following local and hospital treatment, there was some improvement, but repeated exposure to occupational duties seemed to prevent a cure and within a few months the hands and legs were infected. Continuing treatment for several years without a prospect of full recovery persuaded the patient to call for examination April 18th, 1924.

General Examination: At this time it was found that there were many areas of true psoriasis upon the extensor surfaces of the arms and legs and a flaring up of the eczema even involving the inner surface of the left ear.

Progress and Treatment: Treatment began the same date and has continued to the present as follows: Six in April, 13 in May, 11 in June, 11 in July, 6 in August, 7 in September, 5 in October and 3 in November, the last being given Monday evening of this week, at which time there remains no evidence of either malady except a slight induration at the ankles and some itching within the left ear.

CASE NO. 4: Leslie H. Race, Caucasian; Type, Blonde; Height, 70 inches; Weight, 1[illegible] pounds; Present age, twenty-seven; Occupation, trimmer in autobody factory.

Family History: Negative.

Complaint and Development: Period of onset, childhood. Following the ordinary run of children's diseases, the patient became practically free from any form of skin pathology until February, 1924.

General Examination: He was examined April 1st, this year, revealing a true and typical psoriasis situated upon the scalp, face, arms and legs, accompanied at times by intense itching.

Progress and Treatment: Treatment began immediately and continued to August 23rd, 1924. He received 13 in April, 8 in May, 4 in June, 4 in July and 2 in August. Following the fourth treatment to arms and legs, a severe dermatitis developed and persisted for about four weeks. There was also an increased development of lesions over the entire body from hair to toe nails; soreness of muscles began and a slight febrile condition persisted. Evidently here was an idiopathic case and

might seem proper to withhold further radiation for a time at least. This was not done, however, but the dosage was regulated to meet the condition and when, at my request, the patient last visited me, the day following election, there was complete absence of any skin or constitutional pathology.

CASE NO. 5: Vera U. Race, Caucasian; Type, Blonde; Height, 65 inches; Weight, 123 pounds; Present age, twenty-three; Married; Housewife and mother of four living children, two boys and two girls.

Present Illness: Period of onset, 1917.

General Examination: Examined September 6th, 1923, at which time there was involvement of scalp, elbows, knees and a few scattered areas over thighs, buttocks and chest.

Progress and Treatment: Treatment began on September 6th, 1923, and continued at four-day intervals to May 31st, 1924. At this time all lesions had disappeared and a notation of a five months' pregnancy was recorded. Owing to the type, severity and long standing of the malady, it was considered advisable to administer preventative dosage during the remaining months of gestation. She received 2 treatments in July, directed over knees and elbows; 1 in August to scalp and 1 in early September over the buttocks. A normal male child was born at the hospital during the latter part of September, and during the second week of October she reported at the office for treatment of the knees and elbows, and again two weeks later for an application to the nape of the neck. The second child, a girl, has shown a psoriatic tendency, while the remaining children exhibit no evidence of the disease thus far. Denied the pleasure of nursing any of the first children, the mother is now overjoyed because she has more lactation than necessary for the babe, and her obstetrical chart shows a normal delivery and recovery. When last seen the only evidence of past pathology of the skin was a slight induration over the elbows and knees, both devoid of any inflammatory base.

GENERAL CONSIDERATION

None of these cases may be considered cured; each was selected as a test case for treatment by x ray only and denied the application of lotions or the taking of drugs.

No history of luetic infection could be obtained and a Wasserman was taken on the second case, which report showed to be negative.

In all of the cases where itching was present, relief was afforded not later than the fifth or sixth radiation, followed very soon by a decided clearing of the lesion.

Diet was not restricted, with the exception of the fifth patient, who, due to her state of pregnancy, received advice appropriate for such cases.

When these patients first presented themselves for consultation and examination, no assurances were given them as to the number, time or expense necessary to effect a cure, if such a thing were possible. Later, as the reaction from the treatments manifested a betterment of the condition and the patient began to acquire a hopeful attitude, suggestion by the operator was then applied to the point of cheerfulness and persisted throughout the entire course, thus maintaining a confidence so necessary to a successful issue. Each patient was permitted to follow his or her vocation.

Much might be said as to the etiology of this disease, opening the vast field of heredity, endocrinology and biochemical changes, whether through the skin, blood or ductless glands. It is not the purpose of the writer, however, to enter such a controversy at this time.

Children have not been excluded from this form of treatment, but due consideration has been given the action of the rays upon embryonic tissues. It is my firm belief that the pinhead sized papule contains the necessary germination for contamination of the entire body; therefore, it is desirable to keep the patient under continuous observation, so that a destructive dose of rays can be given when such a lesion first makes its appearance.

Pardon me the digression, but on last Saturday morning a patient asked me this question: "Will x ray treatments sterilize a young woman?"

You know the answer must have been—Intentionally, yes!

She then explained that her niece, the daughter of an elderly practicing physician, had for years been subject to a form of eczema that seemed to resist all of the treatment applied by ordinary methods, and she, my patient, had advised the mother of the girl to try x ray. This the doctor would not permit, fearing his daughter might become sterile or that the progeny of the second generation might be

deformed, basing his opinion on the results of experiments with the rays performed upon rats. I presume we all remember the illustrated article referred to, appearing in the *American Journal of Roentgenology*. This, then, opens up a sociological question which demands an answer.

To such a patient I would put this question: "Which do you prefer—relief from your own suffering, even though it entails the possibility of sterility; or to continue uncured, perhaps marrying and bearing children who will undoubtedly inherit and exhibit the same disease you now have and which would be as distressing to them as it has been to you?"

Of course, to us as medical men the experimentation with rats is very interesting, yet personally it has not been my wont to be scared by every bugaboo that appears in print, although found in one of our own worthy journals.

May I not mention that at the present time I am treating a five-year-old boy who has a coin size spot of psoriasis upon the outer aspect of his right leg, which was first noticed three months ago? His father when a child had so-called scrofula, but for years has shown no lesions. The paternal grandparent and his father had some skin affliction; none of the living males, which includes the boy's grandfather, give a positive Wasserman, yet the grandfather consults me each spring to receive a few treatments upon his hands for a "breaking out."

DOSAGE

The dosage administered was varied (1) to meet the condition present in each individual case and (2) to meet the tolerance of the patient.

Case 1—Average was 5 ma.; 60 kv.; time, seven minutes; D-25 cm.; no filter.

Case 2—Average was 7 ma.; 60 kv.; time, ten minutes; D-20 cm.; no filter.

Case 3—Average was 5 ma.; 65 kv.; time, ten minutes; D-35 cm.; no filter.

Case 4—Average was 5 ma.; 60 kv.; time, seven minutes; D-28 cm.; no filter.

Case 5—Average was 6 ma.; 50 kv.; time, five minutes; D-30 cm.; no filter.

CONCLUSION

(1) Dosage must be varied to meet the condition present.

(2) The psychical element of encouragement should be employed.

(3) Complete cure in eighty-five per cent of cases can be had by the employment of x ray alone, provided the patient acquiesces to our demands.

(4) A general stimulation of the organic functions during and following the course of treatments may be expected.

(5) Succeeding generations will not suffer from induced malformations, where guarded dosage is employed, but will be freed from one of the most repellant and resistant dermatological affections existent.

DISCUSSION

Dr. Foster Hollander (Pittsburgh): The subject is very interesting to me. I am a dermatologist and I like to hear somebody else have something to say about psoriasis and x ray. As long as psoriasis is going to remain the disease that it is at the present time, as long as as little is known about its etiology as we know at the present time, I don't know of a better treatment than x ray in psoriasis. The important thing is carefulness.

The amount of dose which should be used in a case of psoriasis and which the Dermatological Society and the men in dermatology are using is about a quarter of one unit once a week for a period of four weeks. Then we wait a couple of weeks and repeat that dose. Small repeated doses of x ray, if they are kept below the amount of erythematous dose, are absolutely harmless to the skin, but larger doses than that, repeated frequently, will result in x ray burns, and I have seen a fair number of cases of psoriasis who are suffering from x ray burns.

Now, that doesn't speak anything against x ray; that speaks, rather, of the operators who have used it. There is a time we shouldn't use x ray on a case of psoriasis, and that is when it flares up. In a case of that type I believe that you ought to suture the lesion off, wait until that acute flare-up is over, and you will find that your x ray is going to do lots more good. You can also cut down on the length of treatment. As a general rule, it takes from an eighth to one-quarter unit of x ray to clear up lesions. Some of them clear up with four treatments. Chronic cases will clear up with from eight to twelve doses of the amount that I have mentioned. I haven't figured out the Doctor's dose, but it seems to be rather similar to that.

This is the first time I have ever heard of the importance of sterility in x rays in psoriasis and it is a rather important point. Heredity does have something to do with psoriasis, but I wouldn't sterilize anybody so that their progenies would not have psoriasis. I do not believe that it is necessary to sterilize. Even if you have a large surface to treat, you can protect the ovaries and tubes so they do not get too much x ray. I don't believe it would be wise to sterilize patients on account of psoriasis, because even though it is a rather chronic and resistant disease, it doesn't interfere greatly with the patient's life and welfare.

Dr. J. O. Parker: I wish to thank the Doctor for his discussion and also wish to emphasize that point of sterility. The only reason I mentioned that in my paper was to show you how foolish are the questions that come to you from people interested either themselves as patients or some of their friends. Now, of course, my answer was intentionally yes. If you start out to sterilize a patient because you wish to sterilize them, then you can treat the ovaries directly. That sometimes is done where we used to do the other operation. However, in these cases in the application of the rays for dermatological lesions or most any other kind of lesions, wherever you wish to protect the patient from such a thing, as the Doctor stated, you can protect those organs. They may get a little secondary radiation, but I have never known a case of sterility to result from that.

Sometimes those foolish questions are asked by our medical colleagues where they wish to throw a little discredit possibly upon these conditions. You have to be ready to hit them right from the shoulder if you intend to hold your ground. In this connection I wish to say that I have never used the ultra violet ray in any of these skin affections. I am not familiar with it, having none in my office.

I see that the majority of this meeting is made up of men who are on the side of the quartz light. That is fine, because I come here to learn a great deal more about the things of which I know little, and I hope that it is for you, even though you don't practice it, to learn something about what the Doctor and myself and others have been trying to do for the last twenty years or so.

High Frequency Treatment*

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Capt. Med. Orc. U. S. A.,
Pittsburgh, Pa.

MR. President, and members of the *American College of Radiology and Physiotherapy:* It gives me great pleasure to be with you today. The subject assigned to me is a rather large one to try to cover in thirty minutes, so I will mention a few of the most useful treatments using various high frequency currents.

METHODS

It might be well in passing to mention the different forms of high frequency currents available, viz.: the *Oudin, Tesla, d'Arsonval,* and *Continuous Current,* such as derived from radio transmission tubes. This is the current we will use in the future, as it is far superior to any of the other methods of producing high frequency currents, and will give results in treatment that cannot be obtained from any of the other currents. At present, the price of these tubes are prohibitive.

1. The *Oudin* current is used to light up the various forms of vacuum tubes. They are all of use where the condition to be treated is superficial, such as in the various forms of skin disease. Either a mild, soothing, stimulating, irritating or a counterirritant effect may be produced. By varying the current and manipulating the electrode, if kept close to the skin, with a mild current it is possible to give a very soothing treatment. By increasing the current, moving the electrode and lifting it from the surface, a stimulating or even an escarotic effect may be produced. The vacuum tubes are often very useful when in contact with the various mucous membranes, and it should be remembered that if kept in contact too long—seven minutes at most—with a heavy current, they will burn the mucous membrane, causing the electrode to stick and injure

*Read at the Third Annual Meeting of the American College of Radiology and Physiotherapy, Chicago, Nov. 14, 1924.

the membrane. It is also quite easy to puncture the glass, destroying the vacuum and ruining the electrode. Nonvacuum electrodes may be used, but they, too, should be treated kindly if you expect much service from them. The Oudin current can be used direct from a single or multiple metal point or brush for quite a number of conditions. By mounting a needle in a pin vise with a heavy rubber handle, and using a very short spark, a very efficient treatment for moles, nevi, warts, hypoderma keratosis can be obtained. Furuncles can be cleared up with one vigorous treatment by playing the spark in the center of it, where it should point, sparking it until all pain is relieved. Small epithelioma can be cleared up, preferably using one treatment per week until they have disappeared entirely. It is important to push the treatment. Of course, when you first start it is more or less painful, but by forcing the treatment and using it until all pain is cleared up, one treatment will usually clear a furuncle up entirely and will relieve it for all time. In any of these conditions, except boils, it is better to give a number of mild treatments than to give one severe treatment, as the greater the number of treatments one week apart the less scar will be left. In fact, it is very rarely necessary to have any scar.

With the Oudin current, using suitable electrodes, enlarged tonsils can be reduced safely and with very little discomfort.

A long spark, e. g., one-half to two inches, can be used through the clothing when a severe counterirritant effect is desired, it being very far superior to any fly blister, and can be used for the same purposes. The spray can be used where a mild counterirritant is desired. You get quite a stimulating effect plus the benefit of the ozone liberated.

2. *Tesla* coils, when properly constructed, can be used even better than the Oudin and, in addition, any treatment obtainable from a static machine may be obtained.

3. Autocondensation may be applied from the Tesla primary or from the secondary or the *d'Arsonval* or Guillimnot Spiral, and means using the patient as one plate of a large condenser having a proper dialectric between the patient and a large metal plate. This treatment may be given on a chair built for the purpose or a couch with a large metal plate covered by a suitable dialectric. I have found patients who would respond very nicely to autocondensation from a Tesla coil who would not respond to the d'Arsonval. The great majority of patients will respond as well and sometimes better to the d'Arsonval. Just why this is so, or which class of patients should have the Tesla and which should have the d'Arsonval, I have not been able to work out as yet.

4. *Diathermy*, or heat penetration, may be obtained from a step-down Tesla or special construction, but most of the machines on the market use a modified d'Arsonval or Guillimnot spiral.

Diathermy is best applied by using bare metal plates or disks, one on each side of the body, placed so that the diseased organ or tissue is in the direct path of the current. In applying diathermy it is always well to begin the treatment with a very mild current, increasing it very gradually, and it is not always necessary to increase it to the point of tolerance of the patient. In fact, in some cases it is much better to give a mild current over a long period. The current should be passed as nearly directly through the part to be treated as possible. The depth of the point of greatest heat intensity is controlled by the size of the plates. A very good way to estimate this point is to draw imaginary lines from the edges of one plate to the edges of the other, crossing the lines, where the lines cross is the point of greatest heat intensity. For example, by using a large plate on the back and a small one in front, this point is brought very close to the anterior surface of the body, remembering that the heating begins where the lines intersect and extends outward to both electrodes. This enables us to localize the treatment quite accurately to any organ or part of the body we wish to treat. For the large electrode, sheet aluminum, No. 10 gauge, a 4 by 14 inch and a 10 to 12 by 14 inch, are very serviceable, using nickeled brass disks 2, 3, 4 and 5 inches in diameter for the smaller electrodes. A very convenient way is to have a five foot length of high tension automobile cable permanently attached to each disk with a battery clip on the other end. This prevents the wire slipping loose from the disk and possibly burning the patient.

I might add that it is well to solder or fasten a wire to the disk, preferably passing it through the pole and putting a set screw down on the wire, or even soldering it to the post or to the disk. Then put a little tape around

the disk to protect it, to keep it from moving too much; if it moves too much, it will soon break off.

In closing this paper, I would call your attention to four conditions which respond very nicely to diathermy, viz., Pneumonia, Diabetes, Bright's and Anemia.

Pneumonia can be treated very successfully by placing a large plate on the back of the chest, using a 3, 4 or even a 5 inch disk, depending on the size of the patient, passing a current of 1,500 to 2,000 ma. When the patient complains of the disk being hot, shut off the current and move the disk, repeating this until the entire chest is well warmed, then treat the diseased area until all pain is relieved. The patient will usually go to sleep after the treatment and sleep well for three or four hours. As soon as the patient wakes up repeat the treatment. Usually in two or three days the patient is practically well, if the treatment has been started early in the course of the disease.

For *Diabetes* and *Bright's Disease*, the treatment is very much the same. A large plate is placed on the back, a four or five inch disk being placed on the abdomen in the following manner: first on the epigastrium, then over the liver, then over the spleen, and then over the bladder, ending by treating the epigastric region, being sure that the entire abdomen is well warmed up.

Anemia usually responds very favorably to treatment. Anemic conditions of any kind will respond most wonderfully to the following technique: Use the plate on the back practically the same as for the preceding treatment, directing the treatment at first to the spleen. After warming up the spleen most carefully, I usually treat the epigastrium and sometimes the entire abdomen, paying particular attention to the large bones of the legs. Keep the plate on the back the same as before; simply move the three inch disk down on the leg and adjust it so as to make fairly firm contact. Treat here and over on the side of the leg, then drop down and over the other side of the leg, giving four treatments to the legs. Follow with autocondensation.

The theory is that the spleen and the long bones of the legs have something to do with the formation of red blood cells, and I have practically demonstrated to my own satisfaction that this treatment works out. By passing a diathermic current through the long bones of the arms, long bones of the legs and through the spleen and over the epigastrium, anemic conditions will clear up very rapidly. In one case I increased the hemoglobin 40 points in 15 treatments. That, as you know, is fairly rapid. Once a week will give very good results.

GENERAL TECHNIQUE

Most of these treatments can be given successfully on a good autocondensation chair, using the chair in place of the large plate. In using a thick autocondensation pad, it is much better to use the bare metal plate always applied to the bare skin, being very careful that no part of the clothing is under the plate or disk.

The back plate is placed right over the lumbar region. A very serviceable plate for that is one 4 by 14. If the back is curved a small cushion will be of aid.

I have all of my electrodes fastened with a battery clip, so I can clip onto the end of it. That, of course, leaves a free surface here and a free surface there, but I have no trouble, for I have a greater surface of contact. The disk in front will get warm long before the one in the rear, so that you can usually leave it in one position for the entire treatment. That gives you ample room for the clip, and if your clip tears off, it is away from the patient far enough so that it doesn't have any tendency to burn the patient. I have no trouble from sparking from the other parts of the disk, for the part that comes in contact is greater than the disk that we are using in front.

I gauge the treatment by the effect. I take half an hour for the full treatment every day, if possible, depending on the thickness of the individual, and upon the sensation of the patient. Some put the disk on and hold it until it is so warm that the patient complains of it, then turn off the current and move it to another position.

Wire mesh electrodes are quite convenient for treating irregular surfaces. Wet pads can be used, but there is much more danger of burning the skin than with the bare metal. Soft metal plates, such as sheet lead, block tin and foil, are used by many, but I much prefer the stiff aluminum plates and the disks. Large metal electrodes of various sizes are very useful in treating the vagina and rec-

tum. Ordinary steel sounds can be used in the urethra, but of course the special electrodes, such as a Chapman electrode, with a thermometer in the electrode, are much safer.

1107 Island Ave., N. S.

DISCUSSION

Dr. E. C. Folkmar (Washington, D. C.): Mr. Chairman, I take great pleasure in rising to say a word for Dr. Cruikshank. I feel that it is due him to acknowledge that he was one of the first to use diathermy in the treatment of pneumonia. He has not written as much about it as some others and others are taking the credit. I know that the credit belongs to Dr. Cruikshank for introducing the use of diathermy treatment in pneumonia. We are glad to have him here to give him that credit.

Personally, I have had considerable experience in the treatment of both diabetes and nephritis with diathermy, and I wish to say that if you have not tried treating nephritis with diathermy, do so, having the urine examinations made frequently and you will be surprised to see how quickly you will rid the specimen of both casts and albumin.

I remember one of the first cases of this kind which I treated was my own mother, a woman at that time about 73. The specimens were sent to our laboratory for examination and rapidly cleared up. She is alive today and owes it to diathermy, which is repeated if there is ever return of the kidney condition.

I could give other cases equally as interesting, and I am glad that Dr. Cruikshank has said to you what he has; I can only emphasize what he has said. Diathermy is a lifesaver in diabetes and in nephritis.

Dr. Fouts (Omaha): The Doctor spoke quite interestingly on a very interesting subject. I have never been able to prove a statement or to satisfy myself that a statement that he made relative to the point of greatest heat between elecrodes, is correct. He said the point of greatest heat was midway between those two electrodes. I would like to have him clear that up in his closing remarks.

We know that high frequency currents travel the shortest possible path and we have voltage sufficient to drive them straight through. They should travel the path of least resistance in getting through.*

It was also said that the electrode was held in place until the electrode became hot. The electrode does not become hot only from the heat generated in the tissues. This heat is generated as a result of the resistance offered to the passage of the current and when the tissues get to a certain temperature your electrode adjacent to that will be in the neighborhood of this temperature.

Another point in this connection was the use of steel sounds in the urethra for a high frequency current or diathermy. When we apply a steel sound and attach one end to it and put the other indifferent electrode on the back, our point of closest contact is the tip of that electrode and most of our current is going to travel from that point and not along the urethra. Heat will not be conducted along the walls of the urethra, but where the current starts to leave the sound to pass back to the electrode, there you will get your heat, and from there on back. There is no resistance as long as that metal sound conducts it along the urethra, but there is as soon as it begins to jump between points.

One more point, and that is the turning on of 2,000 milliamperes of current to an electrode that has not yet been tried. It is a dangerous proposition and I am afraid to try it. That is one good reason why you should start low and work up gradually, if there is no other reason. I think it is better in these cases of pneumonia to work up gradually, and I can only lend my approval and testimonial to the results obtained with diathermy in pneumonia.

Dr. C. C. Moyar (Pittsburgh): I think that question of pneumonia should be broadcasted widely to the medical profession.

Dr. Pope spoke about publicity this morning in contradistinction to illegitimate propaganda, and I think that the question of pneumonia should be brought to the medical profession more than any one thing, because of the terrible toll that it takes each year and the quick and definite results that can be obtained from diathermy.

Just last Wednesday evening I saw a case of pneumonia on the second day with a temperature of 102½ degrees and I feared that I would not be able to get out here, but with the use of a portable machine, the following Sunday the patient was entirely out of danger and run a normal temperature.

The attitude I have found among the men of the profession is that it can't be done, and

*Editor's Note: This viewpoint was scientifically presented by C. F. Bowman, *Journal of Radiology*, 6:10-12, January, 1925.

there are a great many in Pittsburgh that don't believe in it. I think Dr. Cruikshank knows that as well as anybody else.

I would like to say in passing that Dr. Cruikshank knows as much as anyone about what a high frequency current is and how it works, for I don't know of an individual who has spent more time in constructing apparatus and working out principles and theories than he has, and some of the stunts that he can make high frequency current do are almost unbelievable.

Dr. L. B. Williams (Toronto): I was interested in both Dr. Cruikshank's and Dr. Folkmar's remarks regarding pneumonia, because I happen to have heard the original paper read in connection with pneumonia in New York and had occasion to have a little discussion on it at that time.

You have two things to consider—you have a pneumonic area and the area of the lung not yet involved. The pneumonic area is dangerous to give even heavy diathermy to, but if you maintain the good area of the lung, and put your diathermy right to that, you can prevent its spreading. Don't try too heavy diathermy through the pneumonic area for that reason, because of the stasis already present.

I would also suggest in that connection that in between times when your diathermy is not working, if you use a thermolight lamp with a pole from the top of your bed to the foot, and ray your patient from the four points, and at the same time maintain circulation, if you don't get more stasis you will not get increased infection. As I said before, if you keep stasis down you are absolutely safe. If you give your patient this light often, say twenty minutes at intervals, and turn him at the different quarter section, you will maintain circulation in your lungs.

Dr. W. F. English (Saginaw, Mich.): I would like to ask the Doctor how this treatment for diabetes compares with the treatment using insulin, and how we may consider the two.

Dr. C. L. Hustead (Falls City, Nebr.): There is one subject that to my mind has attracted more attention than any other one thing in the past few years, and that is diabetes. Diabetes, of course, is a pancreatic disease and I would like to emphasize or mention here that diathermy is an adjunct to diabetes. I have used it in a number of cases, but when we consider that a diabetic condition is amenable in 80 per cent of all our patients to diet, we shouldn't lay too much stress upon diathermy. We are apt to start in treating our diabetics with diathermy and overlook the principal thing of the whole disease—diet.

I have used diathermy on three cases along with dietary regulation. I had these patients in a hospital where I could closely watch them, and I did notice an improvement.

There is another thing about a treatment of this kind. One case that had a kidney abscess, together with the diabetes, died. The patient was being treated with diathermy, and I think that the principal thing that was overlooked was a correct diagnosis. Diathermy used where there is a pus condition without free drainage is a dangerous thing.

Dr. B. B. Grover (Colorado Springs): The reason we differ in technique is that there are no two machines exactly alike or no two physicians exactly alike. We have here the so-called Tesla high voltage current, or the so-called d'Arsonval with the high amperage volt, and the so-called Oudin current that we call cold spark. The higher the frequency the more efficient the machine, so the electrical engineer says, but we have proven differently.

As to the application of a high frequency current of 2,000 milliamperes thrown suddenly upon the patient and thrown suddenly off, I must differ seriously.

The concentration of a current depends upon the area of the electrodes and the distance they are apart, the square of the area of each one, and they are in proportion to that area in square inches. Suppose you are treating a case of Bright's disease. The heat should be concentrated somewhere near the kidney. If we put one of these large iron pads on the back and a small metal disk somewhere over here, we concentrate that current near that small disk somewhere in the abdominal cavity. We are heating up the splanchnic area and not heating the kidney at all.

The action of diathermy is first to irritate the pressor nerve fibre, causing the smooth muscle of the vessel wall to relax, and there is a new rush of blood through that blood vessel. It carries along with it an army of leukocytes. This is especially applicable in pneumonia where we have stasis that must be relieved.

Another point in the technique of the anemia: You put a plate on the back, and you put one down on the femur and where does your current go? Diathermy or high frequency currents take the shortest route from electrode to electrode. The direct current follows the point of least resistance. If you have a moist skin and a direct current, the current goes around the skin; but in a high frequency current, the current goes directly through regardless of what is in the way, whether it is bone, blood tissue or what not.

In the treatment of anemia, it is of the utmost importance to increase hemoglobin and it is an actual fact that you may increase the hemoglobin by heating up the marrow of long bones, the most prominent of which is the femur. But if you want to heat the bone of the femur you must put one pad on one side and another pad on the other opposite side.

There hasn't been anything discovered since the days of Hippocrates that has done much for pneumonia, so don't expect to cure every case of pneumonia with diathermy; and don't expect to cure everything with physiotherapeutic methods. Physiotherapeutic methods are one of the greatest helps that was ever presented to the medical profession. It is a helpmate, it is not the whole business; don't say that there is everything in physiotherapy, but *physiotherapy is one of the most wonderful aids that has come into our professional life.*

Dr. A. F. Tyler (Omaha): I would like to ask Dr. Cruikshank what has been his experience of the use of the high frequency current in the treatment of congestion of the liver accompanied by jaundice and enlargement of the liver, call it what he likes.

Chairman Curran Pope (Louisville): Will the *College* permit the Chair to say a few words?

Allow me to note that when you are applying diathermy to the kidney it is a very simple matter to turn the patient on the abdomen and put the small electrode over the kidney.

Diathermy does relieve nephritis, but it was not the original current that did relieve nephritis. Long before the days of the introduction of diathermy the static wave current was doing it just as well, and a combination of diathermy and the static wave current today is five times as effective as either current alone.

I do not use diathermy in the urethra, but if anyone wishes to use a sound and if anyone wishes to use diathermy in the urethra, all they have to do is to have a steel sound cut down two inches or an inch and a half, have it insulated thoroughly and you are an inch to an inch and a half beyond your meatus and you won't get any mucourethral junction trouble. However, I do not employ it.

Now, how does diathermy affect the pancreas? It cannot restore any of the tissue that is gone, but diathermy, by increasing the circulatory activity and stimulating the cellular condition of the island of Langerhans, produces an increased secretion of insulin that takes care of the patient's need for insulin and does away with the artificial need of its administration. Never forget, also, that outside of that we must look after the inter- and intracellular activity and that autocondensation is valuable. But the most valuable physical modality outside of diathermy is the incandescent electric light bath carried to free perspiration followed by the so-called Swedish resistive exercises, and many and many a case have I seen of diabetic cleared up by that method alone in the old days by Dr. Simon Baruch in New York.

Dr. Omar T. Cruikshank (Pittsburgh): In answer to Dr. Fouts' question, there are a number of ways of testing out that central point. To do it with meat you must have at least eight inches of meat between your electrodes and your electrodes must not be over two inches in diameter, otherwise, you get simply a solid mass or a cone shape. But if you take eight or ten inches of a homogeneous piece of meat, preferably a piece of liver, and put a small electrode, say an inch electrode, on each side of the meat and pass a moderate current through that, not a real heavy current, a thermometer placed down the middle there under each side will demonstrate the heat concentration to you.

In regard to passing a steel sound into the urethra, I did not mention the fact that I use a heavy vaseline around the meatus, over the electrode, say an inch inside the meatus. I am not advocating that as a good thing. I don't use it, but I have used it occasionally and know it can be done without injuring the meatus. You can pass a current into the urethra sufficient to warrant the whole length of your electrode without injuring the meatus, if you use a little bit of vaseline around the meatus. You will find that your heat goes right straight through.

In any treatment start your current gradually and work up to your dosage. After you have the patient's tolerance and know just what that particular individual can stand and know what that particular electrode will stand, then you run it in full current, about 1,500 to 2,000. Of course, that all depends on the tolerance of your patient and the size of your electrode.

Dr. Grover spoke about this plate on the back for treating the femurs. I must have misspoke, for I never used one of those disks to treat the femur; I have my patient sitting in the chair with a heavy copper plate under the femur and pass a current directly from the disk right through the femur here to the heavy copper plate. Ordinarily I treat those cases on a high frequency machine. Of course, it is barely possible to warm up the femur by having a disk on the back there; you could do it if you put it on various sides, but I don't do it in my practice. It can be done, though; but passing it directly through the bone is much preferable. That is the proper way to use it.

In treating nephritis the large pad is placed on the back and the small disk on the abdomen. Taking into consideration that you are using a four-inch pad on the front, it only takes about twice warming up of that four-inch pad until you have the back warmed up real thoroughly, and if you put your hand over the back you will find that this makes contact. I specified definitely to put a pillow under it, so that it does make definite contact. This gives you practically the same effect as using your small electrode over the kidneys. Of course, your idea is to get a very heavy current through the kidneys. Now, in using that pad applicator, press on it, and you get 20 square inches of good contact. After you are putting the four-inch disk four or five times in front, you have four or five times the effect on the back plate there as you have on the front plate.

I put this four-inch pad on and leave it until the patient complains of the heat of the electrode. I leave it there until it is warmed up from the convection heat of the patient. I don't mean to insinuate that the heat is derived from the current passing from the electrode; the heat is derived from the patient, but when you get that electrode heated up from the patient you have got the patient warmed up. That is what I want, and I keep it there until it is.

In your treatments start with 1,000 or 1,500 milliamperes of current. Using a 3 or 4 or 5-inch disk, it is quite an appreciable time before your current heats up enough to make that electrode warm enough for the patient to complain of the electrode being hot, and often after I have moved it three or four places the electrode becomes so hot that it is uncomfortable to put it back. It feels warm when you touch it back to the flesh, and I often set it over on some part of the machine where it is cold until it chills off a little bit, so that you do not have a warm electrode to start with.

Another point. Always wet the electrode. In the winter time especially, a real cold electrode applied to the body gives a certain chill. I usually run a little warm water on it to take the chill off the electrode to start with; I don't warm it, I don't like to put a warm electrode on, but I like to take the actual chill off it and I don't dry it off, I simply leave it moist, and even so there are cases where the skin is so dry that I have had to moisten the skin, especially on an individual that has quite a bit of hair on the body, it is necessary to moisten that hair before you can get real contact with the disk.

There was some mention of abscess. One little point to be remembered in putting an electrode over an abscessed condition is that if you pass a fair amount of high frequency current through a part and it increases the pain, you can pretty nearly swear that you have a closed pus sac to deal with and the safest bet is to call in a surgeon.

A number of times I have had patients come in with pain in the appendix. I would pass a high frequency current through. If the high frequency current increased the pain, I simply insisted very strenously that they go to the hospital immediately and have it operated on, and in no case have I seen an appendix removed where high frequency caused pain but what there was pus, usually quite a little of it.

Of course, what Dr. Pope said about the static wave current and also about the light bath is very true; those are both very valuable modalities and they should not be neglected.

Speaking of tricks, I have been using a little trick that has given me a great deal of comfort and convenience, and that is instead

of using a foot switch, I attach a single ceiling pull switch across the foot switch terminal. The pull switch is fastened to the front of the machine. A large cord from the pull switch is placed in the patient's hands. If it gets too warm, the patient may pull the string and shut the current off. One pull turns the current on and another pull of the same switch turns the current off. There is nothing but a piece of string, no possibility of shorting onto the machine, no possibility of getting a shock. With that method you can take one of those hand electrodes or you can take a disk electrode, place it between the fingers, put it on the neck or any part of the face or body, and pull the switch and turn the current off and on.

I have quite a number of patients that will come in and take their entire treatment without my touching them at all or going near them. They go to the machine and adjust the electrodes, put them on, pull the string and take their treatment. As soon as it gets warm they shut it off.

This is a lazy man's trick, I'll grant you that, but it saves a great deal of time, because by that means you can treat several patients at the same time. It also gives the patient a great deal of confidence, for they know they can instantly cut the current off if it gets uncomfortable.

The Gamma Ray in Science*

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SUBJECTS treated scientifically, dragging one's mind through a maze of data and detail, usually prove decidedly dry material to the listeners and, while the subject matter of this paper is based upon scientific revelations profound in the extreme, yet it is my hope to remove the dull edge which irritates the nerves employed in mental concentration. To accomplish this, I shall not only give you the various phases of scientific development, but shall also try to show their application as workable theories which must be evolved in the work of anyone conscientiously specializing in Physiotherapy. It is the desire within the scientific mind to search through the basic principles of natural law in order to see what is going on therein, which keeps the scientist ever striving to attain the ultimate. All of us are more or less scientific, and no one, to my knowledge, ever shrinks from an accusation which labels him "a scientist," so on this premise I feel quite safe in submitting this paper to you today.

We are all engrossed in the philosophy of life which deals with existence from the time when some influences thrust humanity into this "maelstrom of strife" better known as the world, to struggle on through one certainty, Pain, to another, Death, and it is in this interim that the medical man is called upon to study its every phase calling for alleviation and, at the end, sign the certificate which closes the chapter of the individual's mortality.

In September of this year it was my great fortune to be invited to the Centennial Celebration of the Franklin Institute in Philadelphia, an institution devoted entirely to science in all its ramifications. There I saw gathered together the greatest array of scientific minds that history has ever recorded, and I felt that it might not be amiss to bring before this body some of the impressions that I carried away, insofar as their application to medical science is concerned. It has been my observation that medical thought is all too often inclined to retain the lethargy of routine practice or to pursue lines of research according to accepted theories, failing to consider or even investigate the progress of scientific advancement. It requires the mental and physical characteristics of the pioneer for any individual to come forth with a new idea, no matter how original or scientific, if it does not conform strictly to medical precedence, and it further requires the bulldog tenacity of a Hercules for him to cling to his medical departure once the hand of opposition begins to throw impediments in the road of endeavor.

I am convinced that during the next few years we shall see the dawn of a new era in medicine and surgery with their allied branches. This will come through the adoption of principles based upon facts established by scientific analysis of matter.

*Read at the Third Annual Meeting of the American College of Radiology and Physiotherapy, Chicago, Nov. 13, 1924.

During the years from 1908 to 1913, English and French scientists reached the conclusion and later proved that when the atom of any matter is subdivided to the smallest part possible the final subdivision is the electron, and that the thing that gives the various atoms, such as iron, wood and various other forms of matter their characteristics, is the number of electrons comprising the atom, their arrangement and their electrical charge. They found the atoms to consist of a central positive nucleus, or proton, surrounded by negative electrons revolving in a definite arc and at a definite speed, all of which were accurately measured. During this time a young English scientist named Moseley, who later, at the age of twenty-six, was killed in the trenches at Gallipoli, analyzed all the various forms of matter and found that 92 groups existed, running from hydrogen, the lightest, to uranium, the heaviest. Of these he isolated all but three. This work was published in the proceedings of the *London Philosophical Society* in about the year 1913 and can be found in any large Carnegie library. This he accomplished by subjecting different forms of matter to an x ray light and reading the variations and the changes produced on the gamma ray by means of very delicate instruments. After his death all his computations were checked and rechecked by various English and French scientists and, with very slight variations, were found to be correct.

Sir William Henry Bragg, head of the Royal Institution of Great Britain, and Professor William Lawrence Bragg, both of whom were present at Philadelphia, delivered addresses upon *The Analysis of Crystals by the Use of X Ray*, the latter exhibiting models on the scale of one to one hundred million, showing the exact grouping which takes place in each respective crystallization and why. The affinities for each other were displayed by positively and negatively charged atoms and the resulting groupings were explained and set forth pictorially and mathematically. These groupings of atoms are the direct cause of the difference existing in the crystalline form of the compound. I shall not attempt to give you his mathematics, as they would no doubt make you as dizzy as I admit they did me, but the whole conveyed to me this one idea—that it is possible to produce changes in the joints of chronic arthritis where crystallization plays a prominent part.

I might also add that I have found it possible to demonstrate material changes in these self-same joints by the use of radium and x ray.

Before proceeding further, I wish to call your attention to the fact that in the structure of the atom, the proton, or positive nucleus never leaves the atom except in an x ray tube or in radium, and the rapidity with which it leaves is in direct proportion to its density, which explains why the denser metals, such as tungsten, have proven of such exceptional value in the construction of x ray tubes.

Sir Ernest Rutherford of Cambridge University, who was awarded the Nobel prize for his researches in radio-activity on Thursday evening, September 18th, told how he had succeeded in smashing the nucleus of the atom by subjecting it to the alpha particles, the nuclei, or helium atoms, shot off by radium. To give you an idea of the inconceivable minuteness of the things with which he was experimenting, he illustrated by saying that if 1,000,000,000 inhabitants of the world began counting the atoms in a thimbleful of water and kept counting night and day, each counting three atoms every second, when they had counted for 10,000 years, then only would the census of the thimbleful be completed. He did not merely claim to have smashed the nucleus of the atom, but showed photographs of the explosions his bombardment caused when an alpha particle hit a nucleus. He believes the atom is an electrical structure, its positive nucleus being 1,800 times the mass of the negative unit or electron. He explained how the familiar laws of mechanics seem to apply to the atom except that inside of its nucleus, under some circumstances, some electro magnetic force or possibly some unknown force acts in ways that had not been expected from accepted laws. He asked this question of himself—"What remains behind in the nucleus of the atom after we have knocked out the hydrogen atom?" and his answer was, "We do not know," but added, "The nucleus of the atom is a world of its own and lies at the basis of physics." He remarked in closing that "If you want to know what is inside of a motor car, you knock it to pieces." It seems a trite observation at this time that Sir Ernest Rutherford's concluding remark might be applied to the work of each one here when, every once in a while, we should check up our results and then knock them to pieces and see

whether or not they will hold water. Since listening to him, I am becoming daily more convinced that the healing agency of the future lies with light, employing those from the violet end of the spectrum when we wish to produce radical changes in body structure and those from the red when we wish to influence material circulatory functions.

The science of matter is of necessity a science of the individual, and I am unable to understand how we can expect to attain any high level of efficiency unless we take cognizance of the laws of the atom. It seems to me to be the light of logic on that road to progress which will ultimately remove the guess from medicine. The man of today who proposes this may be branded a "bolshevik of medicine," but no one possessing the courage of his convictions need have any fear of ill-sounding names. To demonstrate to you that it is high time that we should give the "guess" some consideration, especially that having to do with its removal, I shall give you a conversation that I had with a bank president in Pittsburgh. He remarked that if a man came to him to borrow $1,000.00 the main consideration would be his collateral and his honesty in taking care of his obligation, but he stated, "I and many men walk into the office of a surgeon, pay him $1,000.00 and take a chance in getting an even break in the value received column. The thing that makes this is the 'guess' in your profession." I shall let you figure out the justice and merits of this with your own conscience.

I wish to borrow your imagination for a few moments and ask you to conceive the gamma ray traveling with the velocity of light and able to affect all atoms that lie across its path, through all the stages, from a slight excitation, moderate stimulation, intense activation, until the tissue representing life force finally succumbs, and we have destruction. Holding this picture before you, I believe it is easy for one to realize that the gamma ray has a wider field as a therapeutic agent, by this meaning stimulation and the removal of inflammation, than it has as a destructive agent. In my own work I have seen carbuncles wither away in three treatments, alveolar abscesses disappear and a regeneration of bone take place. I have also seen the lymphoid tissue of the body respond as it could through no other modality, but the main point to be considered is that in employing the use of the gamma ray, whether it be from an x ray tube or a piece of radium, you must first know what it is and how it works, if you ever hope to establish a technique that is fool proof.

I shall present one further phase before concluding, and that is to call your attention to the endocrine complex of the individual, and allow you to draw upon your imagination for the various results that may be obtained by subjecting these delicate structures to mild doses of x ray and radium. It is a fertile field worthy of investigation and one which will amaze you and produce results far beyond your expectations, but I must point out one salient factor in the use of so powerful a remedy, and that is that you must ever keep before you the knowledge that once you have produced definite changes in the structure of any organ by use of the gamma ray, there can be no retracing of steps in order to undo any damage created by this procedure.

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DISCUSSION

Dr. O. T. Cruikshank (Pittsburgh): I wish to express my appreciation of the Doctor's paper. I think he is on the right track; I think that is something that should be worked out and worked out very carefully.

The x ray, as it is being used today by many operators, is used for its destructive effect only, and I think there is a constructive effect that can be produced by the x ray that far exceeds its destructive effect. I believe we should stick to it and work it out and get the full constructive benefit from the x ray.

Dr. C. C. Moyar: If you will almost in all instances replace the word "atom" with the word "cell," you will have the beginning of a workable hypothesis for physiotherapy. The human cell consists of a surrounding membrane, which is a nonconductor of electricity, and the greater part of its consistency is lymphoid material. You have in there the cellular substance which holds the charge of electricity. Then comes your nucleus, which also has another membrane around it of lymphoid material and with that the nucleoli, which are the activators or the regulators of electric energy within the cell.

In order to adopt this theory one must say that the body is an electrochemical mechanism, run by electricity alone. The fundamental principles of natural law are electricity, electrical in character, and the cell itself, if you

will consider it as an electrical entity, you will find that it always responds to electrical law. There is hardly any function that can't be explained along that line; you can explain how nourishment gets from the blood stream into a cell, by an affinity or an attraction which is great enough to cause the material to pass through the membrane which is a nonconductor; once it has entered the cell it then becomes a change in the pressure within and waste materials are then attracted and forced out.

I have given this a great deal of thought over a great many years, and the further I go the more I like it and the greater possibilities I find from considering things from that angle.

Radium in Dermatology*

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IN 1896 Henri Becquerel[1] discovered radioactive substances through the medium of a burn sustained by carrying some ore in his waistcoat pocket. It was this burn that gave Pierre Curie the idea that radium might prove useful in medical work.

In 1901 Degrais and Danlos had radium put at their disposal for therapeutic purposes, but it was not until 1906 that Henri Dominici actually demonstrated that therapy by radium was a reality and that various depths of tissue below the skin could be affected by a process of filtration and that such radium rays had a relatively marked innocuousness for healthy tissues up to a certain point; while, on the other hand, they preserved all their special action on neoplastic tissues.

There are three varieties of rays constantly emitted in the disintegration of radium; that is, alpha and beta electromagnetic rays and nonmaterial electromagnetic pulsations of the other called gamma rays. Alpha rays are of short wave length and are easily filtered out with a thin layer of glass, rubber or almost any other material. Beta and gamma rays are progressively more penetrating and very hard gamma rays can be projected through several inches of human tissues and several centimeters of dense metallic substances.

Beta and gamma rays, when they impinge on matter or material, produce secondary rays, varying in their intensity with the density of such material, and it is believed that these are the rays responsible for the biological effect of radium on tissues.

In varying doses these rays are thought to either stimulate, inhibit or destroy the reproductive property of cells, especially embryologic cells, reproductive cells, secretory or gland cells and certain inflammatory or neoplastic cells.

In full doses to the skin radium attacks particularly elastic tissue, reproductive cells of the rete, sebaceous and sweat glands, papillæ, and the epithelial lining of the blood vessels and blood spaces, and if excessive is capable of producing atrophy and telangiectases or even extensive burns comparable to those that can be produced by roentgen ray.

Any attempt, therefore, to produce a permanent epilation of the face in hypertricosis is only to be condemned because of the necessary atrophy that must result to these other tissues in at least some of the cases.

That normal skin tissues subjected to erythema doses of radium do tend to recover more quickly and more perfectly than from a corresponding reaction produced by roentgen ray, I believe to be true, but this may be explained by the fact that less extensive areas are treated by radium than those for which roentgen ray radiations are ordinarily used and there is, therefore, a less extensive area of blood supply cut off.

To state that radium has a selective action on certain pathological tissue is perhaps misleading, but Prime[2] has established that cells devoted to rapid growth and mitosis are de-

*Reprinted by permission of author and publisher: Am. J. Med. Sci., Vol. 169, March, 1925.

cidedly more easily destroyed by radiation than are normal cells which are not mitosing except for purposes of repair, and furthermore, have an adequate equipment of anatomically well formed vessels to supply them.

This explains the excellent cosmetic results that can be obtained in certain types of skin cancer by radium, the cancer cells being destroyed while normal surrounding tissue cells are temporarily inflamed and even stimulated to a process of repair.

The reason why radium is so eminently effective in certain diseases of the skin is due to the fact that we are dealing with surface lesions, most of which can be penetrated by even the hard beta rays, lying as they do within the skin thickness.

Radium placques, therefore, are eminently suited to most of the lesions and for deeper lesions extending in beneath the skin, placques combined with the insertion beneath and around the lesions of radium carrying needles, gives a crossfire method with a maximum raying of the lesion itself and a minimum amount to the skin.

Full strength placques are used from 5 mg. up to 20.52 mg. (a full strength placque is one in which each square centimeter of placque surface contains 5 mg. of radium element. A 20 mg. full-strength placque therefore covers an area of 4 square centimeters.)

As the softer beta rays produce so superficial and irritating a reaction in the skin surface, they have been found to be of little use in dermatological lesions and since 1914 my placques have all had a facing of 0.1 mm. of brass soldered over the face of the placque in order to cut out these irritating superficial rays.

Practically 90 per cent of all rays emitted are alpha rays, 10 per cent are beta rays and 1 per cent are gamma rays, so that where an absolutely full strength placque will produce a mild erythema in two to three minutes, a filtration of 0.1 mm. of brass and 1 mm. of rubber will require thirty to thirty-five minutes to produce a similar erythema.

Temporary alopecia is produced by a full strength placque with a filtration of 0.1 mm. of brass and 0.1 mm. of rubber in fifty-five to sixty minutes, and permanent alopecia results from the application of such a placque for eighty to ninety minutes.

A faint, white, level mark will follow an exposure of one hundred and twenty minutes and a quite perceptible but level scar seems to follow such an exposure from one hundred and fifty minutes followed by more or less development of telangiectases with such a filtration.

Foerster[3] states that approximately one-half of the beta rays are filtered out by a thickness of 0.05 mm. of platinum, 0.1 mm. of lead, 0.11 mm. of silver, 0.13 mm. of brass and 0.4 mm. of aluminum.

Caldwell and Russ have determined that the intensity of the hard beta rays is reduced to about 6 per cent of their initial value after passing through one centimeter of epithelial tissue.

One-half of the gamma rays are absorbed by 6.2 cm. of aluminum, 1.4 cm. of lead and 1.14 cm. of silver.

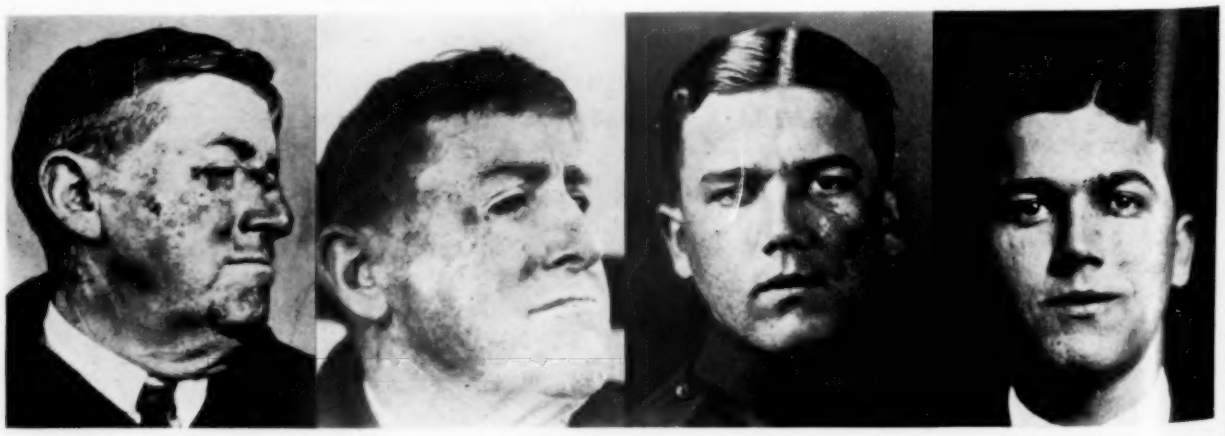

Fig. 1a—Before treatment. Extensive, seborrheic keratoses of the face, with marked degenerations of the nose, eyelid, and outer canthus of the eye.
Fig. 1b—Same, after numerous radium applications.
Fig. 2a—Before treatment. Port wine nevus on left side of face.
Fig. 2b—Same, after radium treatment.

The intensity of radiation is further reduced by distance, but not exactly, I believe, in accordance with the inverse square law, that is, doubling the distance reducing the intensity to one-fourth.

The radium needles used are mostly of 5 mg. platino-iridium, with wall thicknesses of 0.2 mm., and can be left embedded in soft, healthy tissue for two hours with very little reaction and in dense tissue for three or four hours or more.

Where deeper ray effects are required, 0.1 mm. of brass and 5 mm. of rubber will produce only a slight skin erythema after two hours of exposure and a similar erythema will result after a six-hour exposure with a filtration of 0.1 mm. of brass, 1 mm. of aluminum and 5 mm. of rubber, with a penetration of a half inch of living tissue.

The substitution of 1 mm. of lead in place of the 1 mm. of aluminum requires an increase of exposure up to eighteen hours for the production of such a faint skin erythema, with, of course, a penetration of several centimeters beneath the skin.

Radium Therapy in Diseases of the Skin. *Hyperkeratoses.* Clavus and callosities of the feet, two types of lesions that are frequently the cause of pain and discomfort, are so comfortably amenable to treatment by radium that it must be regarded as the method of choice in these lesions.

Soft corns situated, as they are, deep in between two toes, show relief from pain in three to five days, and are quite permanently cured in one application with a full-strength placque filtered with 0.1 mm. of brass and 1 mm. of rubber to cut out the secondary rays, and with an exposure of from forty to fifty minutes.

Several callosities of the soles have been painlessly removed without interruption of locomotion after one or two applications of such a placque for a period of one and one-half hours, the lesions having been previously covered for several days with zinc oxide adhesive plaster and soaked and scraped with a dull knife to diminish their thickness and so save time.

A great many verrucous lesions have been cured in one-hour to two-hour exposures without a known failure and in thick, warty lesions extending under the edges and sides of the nails, no other known method seems to me for convenience and results, to compare with radium treatment. No damage is done to the nail bed with consequent distortion and deformity of the nail, and no trace of the lesion is left after healing has been completed.

Verruca plantaris, seven cases, have responded after placque applications in a most satisfactory manner with a filtration of 0.1 mm. of brass and 3 mm. of rubber, applied for a duration of two hours. After three or four days the patients are able to walk with much more comfort and the only discomfort from which the patients suffer at all is at or about the twentieth day, at which time the discomfort has never been said to be even as great as it usually was before the application was made.

Leucoplakia of the mouth and leukokeratoses of the lips because of the more or less constant irritation of one kind or another to which they are subjected, are so apt to degenerate into squamous cell lesions that their presence is necessarily a matter of great anxiety to the host as well as to the physician.

Fig. 3a—Before treatment. Cavernous angioma, left side of face; baby six months old.
Fig. 3b—Same, after radium treatment. Two years, eleven months old.
Fig. 4a—Before treatment. Old, persistent lupus vulgaris, right side of face.
Fig. 4b—Same, seven weeks after treatment with radium.

Those of a syphilitic nature characterized regularly by atrophy and loss of tissue, are distinctly improved by antisyphilitic measures, and that is, of course, the first line of attack.

In all types of leucoplakia, smoking should be interdicted, various and infected teeth should be removed and a most thorough oral hygiene practiced. Condiments, very hot or cold, and other irritating types of food, should be omitted from the diet, and besides frequent cleansing of the mouth, twice daily the parts may be dried and equal parts of lanolin and rose ointment may be applied and allowed to remain on the lesions as long as possible.

The use of caustics of any kind should be prohibited except, of course, the possible use of the hot cautery.

Radium, I believe, offers the most convenient and safe method of attack for such lesions that show any sign of thickening, ulceration or a tendency to degeneration and in the purely smokers type can be usually relied upon to clear up the lesions satisfactorily. All applications should be made with the idea of producing a profound reaction. Glandular enlargements should be carefully searched for, and the patient carefully watched at monthly intervals for a considerable time after the radiation.

In the superficial smokers type, application for sixty minutes with a filtration of 0.1 mm. of brass and 1 mm. of rubber usually result in a smooth, shiny eschar and a complete disappearance of the lesion.

Where there is any tendency to induration or ulceration, at least two-hour application with 0.1 mm. of brass and 3 or 4 mm. of rubber are necessary, and where there is any suspicion of degeneration or much deep induration, in addition to such a placque 5 mg. platino-iridium radium needles are inserted all around the lesion about a centimeter apart and diagonally directed beneath the lesion toward a central point, for two and a half to three hours. A crossfire application is thus obtained which is most effective in clearing up such lesions.

Seborrheic or senile keratoses, occurring as they do mostly on the face and hands of older people, and particularly those who have been exposed to wind, sun and weather, demand a treatment that is effective, and at the same time leaves a good cosmetic result behind.

Radium answers these demands perhaps better than any other known type of treatment except in the very early superficial variety, that can sometimes be cleared up by a resorcin and sulphur ointment.

When the ointment does not promptly clear up these superficial lesions, a fifty to sixty-minute application of a full strength placque filtered with 0.1 mm. of brass and 1 mm. of rubber is regularly effective, and that without a mark being left behind to show the site of the original lesion.

Deeper seated lesions with more or less chronic inflammatory induration of their bases, or superficial ulcerations, are to be considered more or less seriously, and a ninety to one hundred and twenty-minute exposure should be made after removing the crusts, resulting in a level, white mark left at the site of the lesion, which tends to become more or less nearly the color of the surrounding skin as the months go by.

Fig. 5a—Before treatment. Thick, crusted, discoid lupus erythematosus in large patches scattered over the face.
Fig. 5b—Same, after two and three radium applications to individual lesions.
Fig. 6a—Before treatment. Lupus erythematosus, fixed type, with a moderate amount of infiltration.
Fig. 6b—Same, after treatment. One series of radium exposures.

Very deeply infiltrated lesions or those that have apparently degenerated, should be treated as are frank epitheliomata, and probably better by a crossfire method with 5 mg. needles inserted from beyond their edges, in beneath the lesions, directed toward a central point, plus a placque filtered as described above, and both for a duration of from two and a half to three hours.

Nevi or Birthmarks. Of the nevi the vascular types are much more responsive to radium therapy than are the cellular and pigmented lesions.

Port wine marks are, in the writer's hands, more successfully treated by radium than in any other way, but, the end-results are far less proportionately perfect than in the vascular or cavernous types of lesions.

It is more effective in younger individuals, requiring a more careful technic, never to the point of real reaction. It is regularly necessary to stop short of a complete removal of the discoloration, leaving a faint pinkish color, which, however, is apt to disappear considerably with time.

Two or, at the most, three applications are required for a given area and a third application occasionally results in the formation of large freckles that persist for many months or even years. At least three months should be allowed to intervene between applications and great care must be taken to exclude all secondary rays. Therefore a filtration of 4 or 5 mm. of rubber is necessary beside the 0.1 mm. of brass.

Fifty to seventy minutes of exposure with a full strength placque so filtered, depending on the age of the infant, is as big an exposure as should be given and in the very dull, red, deep-looking lesions more filtration with a corresponding increase in the dose, is indicated. In any case a guarded prognosis should be given, even though the results are sometimes really quite satisfactory.

Vascular nevi, or strawberry marks, are most successfully treated by placque applications of eigthy to ninety minutes with a filtration of 1 mm. of brass and 4 or 5 mm. of rubber. A faint, level whitening of the skin will usually result, especially as more than one application is regularly required. Any considerable erythema is, of course, to be avoided.

Cavernous angiomata are also successfully treated, especially where a crossfire series of applications can be made from various areas of the circumference, directed toward the center, in order that too many rays may not have to pass through any given area of the skin overlying the lesions.

At least 0.1 mm. of brass, 1 mm. of aluminum and 4 or 5 mm. of rubber should separate the skin or mucous membrane from the surface of the full strength placque, in order that long exposures of four to six hours can be made to get a sufficient volume of hard beta and gamma rays projected within the mass to produce an inflammatory reaction of the lining membrane of the deep-lying blood vessels and spaces.

In lesions of the cheek, crossfire placque or tube applications from without and within the mouth can be made, remembering that the dose from the mucous membrane side should be about one-quarter less than that through the skin. Three months should be allowed to intervene between treatments. In one case under constant observation a shrinkage seemed to keep up for a period of almost six months after the last radium application had been made.

Big lesions require the additional use of 5 and 10 mg. platino-iridium needles inserted around the lesions at a distance of 1 and 2 cm.

Fig. 7a—Before treatment, nodular, basal-celled epithelioma.
Fig. 7b—Same, after radium treatment, showing cosmetic result.
Fig. 8a—Basal-celled epithelioma, recurring after operation, extending into inner canthus of eye.
Fig. 8b—Same, after radium treatment, healed four years.
Fig. 9a—Before treatment. Ulcerating, basal-celled epithelioma of nose.
Fig. 9b—Same, healed by radium, four years.

from each other, but should not be left *in situ* longer than three to four hours.

Foerster[3] speaks enthusiastically of the treatment of strawberry marks and cavernous angiomata, but seems not to have obtained good results in the treatment of Port wine nevi.

Pfahler,[4] Newcomet[5] and Robert Abbe[6] have also been successful in the treatment of these lesions with radium.

Lymphangiomata, three cases, have been successfully treated by radium placques with a filtration of 0.1 mm. of brass and 4 mm. of rubber for a duration of one hundred to one hundred and ten minutes. The lesion of the skin recurred at one edge, but that responded to a second treatment, including a surrounding area of skin 1 cm. beyond the lesion. The two mucous membrane lesions cleared up after two applications each for a period of eighty minutes.

Moles, pigmented nevi and pigmented hairy nevi, because of the involvement of the rete and papillary layers of the skin, cannot be removed without some resulting scar. Diathermy, electrolysis or carbon dioxide snow can accomplish their removal so much more quickly than can radium, which to be effective, would have to be pushed to massive destructive doses, that radium is certainly not the method of choice in these lesions, unless they are showing signs of degeneration.

Three cases of malignant melanomata have been treated by very big, massive doses. A lesion of the forearm rapidly growing, the size of a fifty-cent piece, has remained well for a period of five years. The resultant scar was excised in order that a careful microscopical search of all the scar tissue might be made, and no sign of any recurring malignancy could be demonstrated after a most careful and painstaking search. Another lesion on the forehead is well after four years, but one lesion on the toe of a woman was followed by metastatic lesions in the inguinal glands after a few months and the patient died. An amputation had been advised before radium was even considered.

Even with this inconsiderable experience with radium in such lesions but a bigger experience after extensive surgical excision, the writer would prefer to take a personal chance with radium than with surgery. Theoretically, an extensive endothermy operation with the bipolar method of Wyeth should be considered as a sane method of attack, but after all much depends on whether or not any metastatic involvement has or has not already begun. When it has, any attempt at removal in any way is, of course, useless. I am of the opinion that the time to attack these lesions is when they are quiescent and if possible before any metastases have occurred.

Hypertrophies. Keloids and hypertrophied scars are well taken care of by radium in the form of full strength placques, and this particularly applies to young lesions that have not existed longer than six months. Old, hard, fibrous lesions had probably better be excised where suitable tissue is at hand for primary suture without deformity, followed by radium exposures beginning at about the seventh day, to prevent a recurrence after excision. In these old lesions destructive doses of radium must be used if at all and, although a soft, pliable scar results, it does not seem to be the ideal method.

Four or five millimeters of rubber tissue should be used over 0.1 mm. of brass for a period of about ninety minutes (one-third less for very young children).

One such application frequently suffices to prevent a reformation of the keloid.

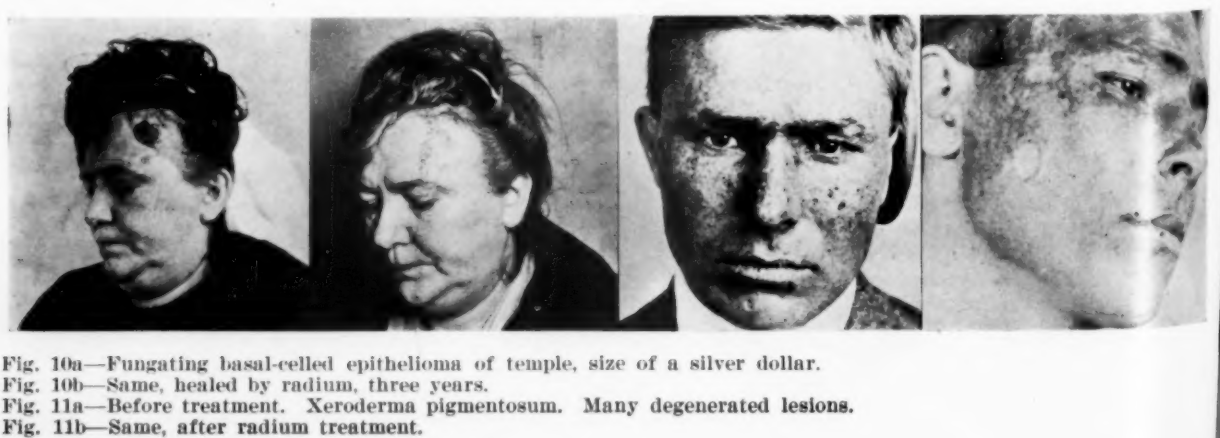

Fig. 10a—Fungating basal-celled epithelioma of temple, size of a silver dollar.
Fig. 10b—Same, healed by radium, three years.
Fig. 11a—Before treatment. Xeroderma pigmentosum. Many degenerated lesions.
Fig. 11b—Same, after radium treatment.

Young keloids require 2 and possibly 3 radiations at two-month intervals, with a filtration of 0.1 mm. of brass and 5 mm. of rubber, plus an added 1 mm. of aluminum, for a period of two to six hours, depending on the thickness of the lesion.

In any case, never more than the faintest erythema of the overlying skin should be produced, because of the tendency to a resulting telangiectasis.

A soft, pliable, level white skin or scar remains at the site of the lesion.

The rather severe pain that sometimes accompanies such keloidal formations is quite regularly relieved by the first application.

Acne keloid has been reported by several authors as successfully treated by radium, but I have had no experience with these lesions except in the use of roentgen ray.

Granulomas. Granuloma annulare (two cases) cleared up quite promptly after a single radiation of seventy minutes with 0.1 mm. of brass and 2 mm. of rubber.

Pyogenic granuloma (one case) on the upper lip the size of a five-cent piece, and three-eights of an inch in depth, cleared up after a single dose of three and a half hours with a filtration of 0.1 mm. of brass and 1 mm. of rubber, and with a better cosmetic result than I have ever previously obtained with either cautery or curettage and silver nitrate stick.

Granuloma fungoids, blastomycosis and sporotricosis should, of course, be as favorably influenced by radium as it is said they are at times by roentgen ray, but the extent of these lesions has prevented any attempt on the writer's part to employ radium in their treatment.

For lupus vulgaris radium has proven to be, it is believed, one of the best means of attack in this country where we have not the Finsen light at our disposal. Two cases involving the lower half of the nose are well—1 now for eight years and several cases around the mouth, 2 with extensions on the mucous membrane, are healed and present only soft, pliable scar tissue, with some telangiectases at the site of the skin lesions.

Small doses are entirely inadequate and placque applications corresponding to what should be four erythema doses, if one can speak in such terms, are necessary.

Beta rays are, therefore, the rays of choice and two to three-hour applications are given with a filtration of 0.1 mm. of brass covered by only a few layers of rubber tissue. Successive applications frequently have to be given, and there is no advantage to be gained by a longer period between applications than six to eight weeks.

Lupus vulgaris and tuberculosis ulcerations of the mucous membranes can often be healed by such a massive dose of radium, of course, with considerable discomfort to the patient. But comfort and cosmetic results are the least of one's considerations in an effort to heal lupus vulgaris lesions anywhere.

Tuberculosis verrucosa cutis lesions have also been healed in several cases, but here again big skin reactions from massive doses are necessary.

In lupus erythematosus I cannot agree with the majority of authors that radium is ineffective in the fixed or discoid type of lesion so frequently seen on the faces of our patients. And this after a very considerable personal experience with this disease.

The disseminated type is a different proposition, portending a serious toxemia of some kind somewhere and, in patients who survive, the lesions can and do spontaneously clear up, usually without any scarring.

In the discoid type any spontaneous healing always results in scarring.

Foerster[3] seems to have possibly explained Highman and Rulison's[7] hypothesis as to the comparative incompatibility of lupus erythematoses and radium therapy in the relation of pathology and effect of treatment, because of the similar end-result in both. He suggested that it may be argued that by the use of radium results are obtained analogous to those that result after the spontaneous healing of lupus, namely, atrophy and telangiectases, and that after roentgen ray treatment, elastic tissue having been destroyed and vessels dilated, lupus lesions seem to retrogress and heal. This they actually seem to do, for no result can be hoped for short of an atrophy by the radium application.

Applications almost always have to be repeated to produce this atrophy and healing. Such repeated applications of sixty to seventy minutes filtered with 0.1 mm. of brass and a few layers of rubber tissue have healed such

extensive lesions as involvement of almost the entire nose, or patches across the bridge of the nose with extensive involvements of both cheeks. Numerous large and small thick infiltrated patches on other parts of the face and head have also healed. True it is that some lesions tend to recur at the edges of the scar, but the incursion of a considerable area of skin beyond the lesion in the radiated area has apparently resulted in a number of lesions remaining permanently well.

Skin Cancers. Krompecker, in 1900, recognized a type of cancer arising from the basal cells of the rete and in 1904 Bloodgood published an important article in which he demonstrated two important types of skin cancer, that is, the basal-cell group of Krompecker and the prickle-cell type, composed of large cells that had retained their prickles, were early destructive and grew rapidly, tended to metastasize and have a general malignancy; in contradistinction to the former group, which grew slowly, did not metastasize and were of a local malignancy only.

Degrais, a dermatologist, in 1901, treated the first case of skin cancer with radium. Since that time thousands of cases of basal-cell epitheliomata have been so successfully treated by this agent that today, I believe, there is no question but that the preponderance of opinion among surgeons who are familiar with its use is in favor of radium as the method of choice in the treatment of such lesions. This would be true for cosmetic reasons alone, to say nothing of the convenience to the patient and the end-results.

In the treatment of the prickle-cell variety of lesion there is no such unanimity of opinion owing to the tendency of the draining lymph nodes to be involved, but occasionally brilliant results have been obtained by bold radium operators in epithelioma of the lower lip and buccal mucosa, coupled with extirpation, or irradiation of the draining lymph nodes. This has been accompanied by such good cosmetic results that it is conceivable that with an improved technique radium, alone or combined with surgery, may yet become the method of choice in this more serious type of lesion.

Cancers of the skin may be divided more or less according to their degree of susceptibility to radiation, into:

1. Basal-cell epitheliomata.
2. Lymphosarcomata.
3. Sarcomata.
4. Prickle-cell epitheliomata.
5. Nevocarcinomata (malignant mole or melanoma).
6. Epithelial carcinomata originating in sebaceous and sweat glands.

Basal-cell epitheliomata present the following more or less common clinical types as described by Hazen:[8]

(a) Superficial, psoriasis-like type.
(b) Superficial, rolled-edge type, with central ulceration or a fungus growth in center.
(c) Deeper ulcerating type.
(d) Superficial, nodular type.
(e) Deep, nodular type, frequently taking form of infiltrated placques.
(f) The morphea-like type.
(g) Cicatricial type, healing in center with nodules or ulcers at edge.

Usually, the location, type, character and growth serve to help us distinguish the basal-cell type, but occasionally a really comparatively benign-looking lesion may turn out to be of the metastasizing type and one must be constantly on the lookout for a possible, rapidly developing recurrence or a beginning glandular activity. Rarely have reports come in of basal-cell tumors developing typical basal-cell metastases. One of my own cases, at the age of 84 years, two and a half years after removal of an apparently classical basal-cell epithelioma of the left ala of her nose developed a metastatic lesion in her left cervical region.

Fortunately, the great majority of epitheliomas of the face where a good cosmetic result is of major importance, are of the rodent ulcer or basal-cell type, with the pronounced exception of cancer of the lower lip, where absolutely the reverse holds true.

Cancers of the upper lip are usually basal-celled, as are those of the lobes of the ear. Malignant lesions of the skin of the body and extremities are more frequently of the prickle-cell variety and frequently develop on tuberculous, specific or other chronic ulcers and on seborrhoic or senile keratoses, warts, moles, angiomas and nevi that are subject to more or less constant irritation, such as picking and scratching.

Leucoplakia of the buccal mucosa and lips are frequently forerunners of prickle-cell cancer in these regions.

The basal-cell type of lesion is the one that has especially interested the writer as a der-

matologist and particularly those of the rodent ulcer type. These are said to occur on the face above an imaginary line connecting the angles of the mouth with the lobes of the respective ears. Fortunately, the very great majority of skin cancers in this area are of this type, for it is here that a good cosmetic result is a matter of considerable importance, and radium gives this end-result par excellence. Particularly is this true in lesions around the eyes, of the eyelids themselves, the ears and the alæ of the nose.

Francis Carter Wood[7] estimates that the majority of human cancers require five erythema doses of radiation to destroy them. But, he adds, it is understood that the basal-cell tumors of the face are excepted, since it has been known for many years that most of them will disappear with one or two erythema doses, provided they have not invaded cartilage or bone, in which case a much higher dosage is necessary to be effective.

None was controlled by biopsies, as lesions were on the face and cosmetic results had to be considered.

Upwards of 200 cases of skin cancer have been treated by the author since 1912. Only 10 bad results are known and, of these, 6 were cases of squamous cell epithelioma about the face or mouth that were inoperable or had refused operations and a good result could not have been even hoped for. Of the remaining 4, 1 was an involvement of the whole lobe of the ear, 1 involved the periosteum of the right temporal bone, 1 the periosteum of the left malar bone and the fourth was an accidental leaving of a protecting sheet of lead between the eyelids and eyeball for several days, with the loss of the eye. The malignant lesion had involved the periosteum as well as the inner canthus of the eye and promptly recurred. The patient lost his life under the anesthetic given for the enucleation of the eye and the removal of the periosteal lesion.

Fifteen lesions of the eyelids have been treated with good success in 14, the one failure being the case just described.

Four cases of extensive involvement of the cartilage of the ear have been treated and three of them are well, with excellent cosmetic results.

Of all the cases, 13 are known to have remained well for seven years; 16 for five years and 86 for upward of three years.

Twenty-one cases have required a second application to clear up the lesions or have recurred, but healed promptly under additional applications.

The best results, undoubtedly, have been obtained in the cases treated during the past three years, owing to the frequent combining of five mg. radium needles, inserted around or beneath the lesions, with a suitably filtered placque applied to the surface. Certainly, the cosmetic results have been better, owing to the fact that this combined method required less exposure through the surface from the placque.

It may be laid down as a rule, I believe, that lesions that do not clear up or nearly so under one single, intensive dose and certainly, after a second effort, should be promptly referred to the surgeon for surgical or endothermic removal. Such lesions probably are not of the basal-cell type or have involved the periosteum or are of that unusual basal-cell type, very rare and about which we know very little, which is exceedingly resistant to radiation.

A. The superficial, psoriasis-like type of lesion can be healed without scar by a full-strength placque exposure, filtered with 0.1 mm. of brass and 1 mm. of rubber for a duration of sixty minutes.

B. The superficial, rolled-edge type, with a central ulceration or a fungating growth in the center and D, the superficial, nodular type, require a two-hour exposure with 0.1 mm. of brass and 2 mm. of rubber.

C. The deep, ulcerating type, and E, the deep, nodular type, demand the insertion of 5 mg. platino-iridium needles, inserted from beyond the circumference beneath the lesions, directed toward a central point at intervals of 0.5 to 1 cm., plus a full-strength placque filtered with 0.1 mm. of brass and 5 mm. of rubber, both for a duration of three hours or more.

Degenerated, thick, pigmented nevi and melanomata require a similar attack, but with a duration of both for a period of from four to six hours *with* an additional 0.5 mm. of aluminum filter placed on the face of the placque.

It would seem that lesions involving the periosteum had better be treated surgically or by a combination of surgery and radiation.

Nodular lesions of the eyelids are successfully treated by the insertion of five mg. radium needles placed immediately beneath them

at 0.5 cm. intervals for periods of from two to four hours.

It is believed that a fertile field for bold radium operators lies in the treatment of carcinomas of the lower lip and lesions within the mouth. In these cases the cooperation of a surgeon is always essential; any glandular enlargement should demand surgical removal, and that completely, of the submaxillary and even perhaps of the cervical regions.

Two of my cases stand out so well that they will bear reporting. Both had refused operations on the lip and tongue, respectively, both accepted surgical removal of glands that felt stony hard in one of their submaxillary regions and, incidentally, a careful search of the removed glandular tissue of both failed to show any malignant involvement. Both had been seen by several surgeons and pronounced malignant lesions.

The lip case has remained well for two years, after a crossfire from the mucous membrane and skin surfaces and needles imbedded in the substance of the lip.

The tongue case was a very extensive leucoplakia, with a carcinomatous degeneration of the right half near the midline the size of a hickory nut. This lesion healed promptly with some slight discomfort after combined needle and placque applications and has remained healed for one year. Two other small, beginning degenerations of his leucoplakia at distances of at least ½ inch from the old lesion, due to irritation from his continued excessive smoking, healed promptly after the use of needles alone.

A therapeutic test treatment of 10 salvarsan injections at three-day intervals (3.4 gm. in all) had, previous to the treatment, failed to make any appreciable effect on the lesion.

Brewer[10] believes from statistics that he had collected "that the results of surgical treatment of lip cancers are superior to those as yet obtained by radium. On the other hand, in cancers of the cheeks, the results obtained by radium are so evidently in advance of those obtained by operation, that until it can be demonstrated by a series of well observed three or five-year cases that operation will give equally good results, all cancers arising in the mucous membrane of the cheek should be treated by radium."

Broders[11] gives food for thought in lip cases when, in a resume of 537 lip cancers treated surgically, he reports a mortality of 82.6 per cent in patients with metastases and of 23.73 per cent in those in whom no metastases were demonstrated. He states that no patient with cervical lymph nodes involved or with more than one group of any lymph nodes involved had been reported living.

Lymphosarcomata should respond at least equally well to radium as to the roentgen ray, but I have had only one experience with the latter.

Xeroderma pigmentosum (one case in a man, aged 23 years) has been carried comfortably and well through a period of five years, by the internal administration of arsenic at intervals and the removal of many degenerated lesions on his face, as they appeared, by radium placque applications with most excellent cosmetic results.

Five cases of roentgen ray degeneration in old, chronic extensive roentgen ray burns have been more successfully taken care of by radium applications and the frequent use of equal parts of lanolin and cold cream than by any other of the various methods that have been suggested.

Only exceedingly small doses of twenty-five minutes with a filtration of 0.1 mm. of brass and 1 mm. of rubber are necessary to clear up early superficial nodular or ulcerating degenerations as they arise. Larger doses are productive of long-standing, sluggish ulcers that are exceedingly painful.

Cheilitis exfoliativa of both lips; two extensive cases, have been cleared up after repeated, filtered placque applications.

Sarcoid of the Darrier-Roussy type; 2 cases remain well, 1 after four years and 2 typical cases of Paget's disease of the nipple, declining operation, are well after three years and one year, respectively. They are, of course, under a most careful and frequent observation.

Three-hour applications with a filtration of 0.1 mm. of brass and 5 mm. of rubber are necessary in the treatment of the sarcoid lesions, as these lesions are quite deeply seated in the skin.

SUMMARY

Radium seems to stand out pre-eminently as the method of choice in the treatment of basal-

cell epitheliomata, vascular nevi, warts of various kinds, leucoplakia of the mucous membranes, keloids and seborrheic keratoses and probably in lupus erythematosus and lupus vulgaris.

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EDITORIAL

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AMERICAN COLLEGE RADIOLOGY AND PHYSIOTHERAPY

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Hollender and Cottle Clinic—"Physiotherapy in Eye, Ear, Nose and Throat Practice" *A. R. Hollender, M. D., and M. H. Cottle, M. D.*

TUESDAY, OCTOBER 20, 1925

Registration

Business Session

Presidential Address—"The Past, the Present and the Future"—*Curran Pope, M. D.*, Louisville, Ky.

"Status of Radiotherapy in Otolaryngology," *Ira O. Denman, M. D.*, Toledo, Ohio, Otolaryngologist.

"Radium Therapy," *C. W. Hanford, M. D.*, Chicago. Consulting Radium Therapist Cook County Hospital.

"Radiation Therapy," *J. R. Ranson, M. D.*, Denver Colo. Formerly Consulting Physician Colorado Radium Company.

"The Radiological Diagnosis of Early Pulmonary Tuberculosis," *Roland G. Breuer, M. D.*, Norton, Kans. Assistant Physician Kansas State Sanatorium for Tuberculosis.

"The Value of Actinic Therapy and X-ray in the Treatment of Pulmonary Tuberculosis — A Preliminary Report," *R. W. Fouts, M. D.*, Omaha, Nebr. Roentgenologist Lord Lister Hospital.

"Artificial Light Therapy in Tuberculosis," *Edgar Mayer, M. D.*, Saranac Lake, N. Y. Physician Saranac Lake Sanatorium for Tuberculosis.

"Quartz Light Therapy in Otolaryngology," *Roy A. Barlow, M. D.*, Madison, Wis. Otolaryngologist University of Wisconsin.

"Water as a Therapeutic Agent," *Charles E. Stewart, M. D.*, Battle Creek, Mich. Physiotherapist Battle Creek Sanitarium.

"Therapeutic Exercise—A Neglected Method in Physiotherapy," *J. C. Elsom, M. D.*, Madison, Wis. Physiotherapist University of Wisconsin.

"Galvanism—Its Availability in Gynecology," *J. U. Giesy, M. D.*, Salt Lake City. Editor *California and Western Medicine*.

"Why I Use Ultra Violet Energy in the Practice of Medicine," *Leo C. Donnelly, M. D.*, Detroit, Mich.

EVENING SESSION

"The Effect of Sunlight on Growth and Development," (illustrated), *W. T. Bovie, Ph. D.*, Professor of Biophysics, Harvard University.

Fellowship Gathering and Smoker.

WEDNESDAY, OCTOBER 21, 1925

"Some Uses of Irradiated Dyes in Medicine,"
J. G. Walsh, M. D., Woodbine, Ia.

"Galvanism in Ulcers and Fistulæ,"
Miles J. Breuer, M. D., Lincoln, Nebr.

"Diathermy in Gonorrheal Diseases of the Male,"
Damon Brown, M. D., Madison, Wis.

"Diathermy in Gynecology and Genito-Urinary Practice,"
B. H. Hager, M. D., Madison, Wis. Urologist, University of Wisconsin.

"Diathermy on Medical Kidney Disease,"
Gustave Kolischer, M. D., Chicago. Associate Professor Genito-Urinary Diseases. Post Graduate Medical School.

"Surgical Diathermy in Papillomata of the Bladder with Demonstration of Patients,"
F. L. Nelson, M. D., F. A. C. S., Ottumwa, Ia.

"Bladder Tumors as Treated by Thermo-Electric Coagulation,"
B. C. Corbus, M. D., Chicago. Inventor of Thermaphore for Treatment of Endocervicitis by Diathermy. Author of Book on this Method of Treatment.

"X-Ray Therapy Twenty Years Ago,"
William Allen Pusey, M. D., Chicago. Past President American Medical Association. Professor of Dermatology, University of Illinois Medical School.

"Newer Methods in the Treatment of Defective Hearing,"
M. H. Cottle, M. D., Chicago.

"The Use of the High Frequency Currents from the Surgeon's Standpoint,"
A. David Willmoth, M. D., Louisville, Ky.

6:30 P. M.

Annual College Dinner—Educational Program,
Wm. Allen Pusey, M. D., Past President American Medical Association.

Maurice Fishbein, M. D., Editor Journal American Medical Association.

D. J. Davis, M. D., Professor Pathology and Bacteriology, University of Illinois Medical College.

THURSDAY, OCTOBER 22, 1925

"Blundering Diathermy,"
B. B. Grover, M. D., Colorado Springs, Colo.

"Appendicitis, Its Diagnosis,"
W. A. Rush, M. D., Beatrice, Nebr. Roentgenologist Hepperlin Clinic.

"X-ray Diagnosis of Dental Infections,"
S. A. Levey, M. D., St. Louis, Mo.

"Electro-Coagulation in the Treatment of Malignancies,"
A. Oaks, M. D., Preston, Ont.

"Diathermy in Infections,"
W. B. Chapman, M. D., Carthage, Mo. Vice President American College Radiology and Physiotherapy.

"The Treatment of Non-Union or Delayed Union of Bone and Bursitis,"
F. B. Granger, M. D., Boston, Mass. Radiologist and Physiotherapist, Boston City Hospital.

"Observations on Physiotherapy Abroad,"
Disraeli Kobak, M. D., Chicago. Attending Physiotherapist Cook County Hospital.

"Electrothermic Methods in Surgery,"
Wm. L. Clark, M. D., and *H. H. Bass, M. D.*, Philadelphia, Pa. Dr. Clark is a pioneer in the use of electrocoagulation in surgery.

"Endocrines and Physiotherapy,"
Maxmilian Kern, M. D., Chicago. An internist of wide experience in endocrinology.

"The Treatment of Burns by Radiotherapy,"
E. B. Kessler, M. D., St. Joseph, Mo.

"Dermatology and Ultra Violet Therapy,"
Lynne B. Greene, M. D., Kansas City, Mo.

"The Part that Electrotherapy Plays in the Correction of Disease,"
W. P. Grimes, M. D., Kansas City, Mo.

"Physiotherapy in General Practice,"
L. S. Merrill, M. D., Ogden, Utah.

"Physiotherapy in Tonsil Pathology,"
J. B. H. Waring, M. D., Blanchester Ohio.

"The Present Status of X-ray Dosage,"
Albert Bachem, Ph. D., Professor of Biophysics, University of Illinois.

"Roentgenologic Aid to the Bronchoscopist,"
Gabriel Tucker, M. D., Chevalier Jackson Clinic, Philadelphia.

"Treatment of Industrial Cases with Physiotherapy,"
E. C. Duval, M. D., Chicago.

"Physiotherapy as a Necessity in Industrial Surgery,"
Frank H. Walke, M. D., Shreveport, La.

"A Critical Study of the Use of Autocondensation in Hypertension,"
Fred B. Moore, M. D., Loma Linda, Calif.

"The Interpretation of the Dental Radiogram,"
William A. Luric, M. D., New Orleans.

"The Treatment of Aortic Fatigue by Physiotherapy,"
Arthur E. Joslyn, M. D., Lynn, Mass.

"The Treatment of Various Forms of Ulceration by the Use of Ultra Violet Ray,"
Albert Krohn, M. D., Detroit, Mich.

"More Accurate Methods of Measurement of X-ray Dosage,"
Roswell T. Pettit, M. D., Ottawa, Ill.

International Cancer Commission

THE establishment of an international commission for the study of cancer, particularly its etiology and treatment, is hoped to greatly facilitate the wonderful research work that has been carried out along this particular line. Numerous individual organizations in the various medical centers have been studying this tremendously vital subject in as many individual ways. With the establishment of a commission composed of international medical authorities, appointed by the Health Committee of the League of Nations, greater co-operative work can be accomplished. At present the commission consists of representatives from Italy, Netherlands and France, with possible representatives subject to appointment from other countries.

A Beneficient Gift

WORD has been received that a real endowment was granted the Belgian Anti-cancer League for the advancement of their research activities. The Katanga Mining Company, possessing the richest radium deposits in the Belgian Congo, presented to the Belgium Anti-cancer League eight grams of radium. The Belgium Government further aided in the propagation of these research activities by granting to the clinics in Brussels,

Louvain, Ghent and Liege for the year 1925 one-quarter of a million francs each, to be used in studying the methods indicated for the extermination of cancer.

California Pioneers in Physiotherapy Development

HAHNEMANN Hospital of the University of California did pioneer work in establishing a large, well equipped physiotherapy department, with doctors to prescribe and trained physiotherapists to apply these instructions in the treatment of disease on a large scale.

Stanford University Medical School did pioneer work in establishing the first scientific course for the training of physiotherapy technicians. The California Association of Physiotherapists again were so far-seeing in their method of organization that their constitution and by-laws have largely been adopted elsewhere and by their national association. Columbia University has recently added courses of instruction modeled upon those of Stanford, and hospital physiotherapy departments modeled upon the one at Hahnemann are now widely scattered.—*California & Western Med.*, 23:328, March, 1925.

United States Civil Service Examination

THE United States Civil Service Commission announces the following open competitive examinations:

PHYSIOTHERAPY AIDE
PHYSIOTHERAPY PUPIL AIDE
PHYSIOTHERAPY ASSISTANT

Receipt of applications for these positions will close October 24 and November 28. The dates for the assembling of competitors will be stated on the admission cards sent applicants after the close of receipt of applications.

In the Public Health Service the entrance salary for physiotherapy aide is $1,020 a year, with quarters, subsistence and laundry; for physiotherapy pupil aide, $720 a year, with quarters, subsistence and laundry, or $1,200 a year without allowances, and for physiotherapy assistant, $1,560 a year, without allowances.

In the Veterans' Bureau the entrance salary for physiotherapy aide is $1,680 a year; for physiotherapy pupil aide, $1,000 to $1,400 a year, depending upon the training and experience of the appointee; and for physiotherapy assistant, $1,320 to $1,600 a year.

The duties of physiotherapy aides consist of administering physiotherapy in its several branches—massage, electrotherapy, hydrotherapy, mechanotherapy, thermotherapy; active, passive, resistive and assistive exercises and remedial gymnastics; keeping daily record of the work and progress of each and every patient coming under direction and treatment; and making the required reports of the activities of the reconstruction work in physiotherapy.

The duties of physiotherapy pupil aides will be the same as those for physiotherapy aide, except that they are pupils under the supervision and instruction of the chief aide in all the work above mentioned.

The duties of physiotherapy assistants consist of administering to special cases the treatments of physiotherapy, as massage, electrotherapy, hydrotherapy, thermotherapy, mechanotherapy; active, passive, resistive and assistive exercises and remedial gymnastics; keeping a daily report of the work in progress on each patient under the appointee's direction and treatment; and making the required reports of the activities of the reconstruction work in physiotherapy.

ABSTRACTS and REVIEWS

Light Therapy: Symposium

APPRECIATION

Appreciation of the true value of sunlight was not fully realized by the medical man until our present age. It was a part of life that, as far as they were concerned, had always been present, would always continue to be, and its necessity, although realized, was never seriously investigated. As most other valuable therapeutic adjuncts, the incentive for its scientific evaluation came from practical application. The editor of the *Atlantic Medical Journal* strikes the keynote.

The Growing Appreciation of the Value of Light Therapy. Editorial Atlantic M. J., 28:523-525, May, 1925.

IN this article the editor reviews the work that has been done in the development of the science of light therapy. Its first application as a medical adjunct was in the treatment of tuberculosis. The action of the rays has never been definitely determined, although it has been shown that the ultra violet rays are active principles in its therapeutic activity. However, the artificial rays do not seem as beneficial in the treatment of tuberculosis as direct rays of the sun. In all probability, there are other rays, as the heat rays, emitted from the sun, that aid the action of the ultra violet rays.

In rickets, the artificial rays have been of decided value. The time-honored treatment for rickets has been the administration of cod liver oil. It has recently been shown by individual observers that the radiation of inactive oils and rachitic substances will render these substances antirachitic. Whether there is a chemical alteration in these substances or whether absorption of the active principle has taken place, no one knows. It has been demonstrated, however, that the ricket-curing substances would fog a photographic plate screened by quartz, thus establishing the fact that these substances are radio-sensitive.

In the treatment of x ray traumata the ultra violet ray has been found valuable. It seems that the x rays and ultra violet rays are identical energy, excepting for wave lengths. It is difficult to see where ultra violet rays end and the x rays begin. The ultra violet ray has been spoken of as the long and soft x ray, while the x ray has been referred to as the short and hard ultra violet ray.

Reference has also been made to the application of radiant energy in the treatment of pyorrhea. After only two or three applications of the quartzlight, the puffiness has been noted to decrease, the pockets have closed, the teeth have tightened and the recession of the gum margin has been entirely arrested.

Ultra violet energy has long been recognized as indicated in calcium deficiency diseases. Yet in the numerous nervous disorders where there is a definite calcium deficiency metabolism the ultra violet energy has not yet been applied.

The subject of sunlight therapy, although an old one, is in its infancy as far as development is concerned. Much has been done in the way of determining its applicability to various diseases, but the surface has barely been scratched.

RESEARCH OBSERVATIONS

Attention need not be called to the scientists whose investigations appear in abstract form. The works of Hess, DeBuys and Bovie have received world-wide recognition and their observations are regarded as scientific facts.

The Ultra Violet Rays of the Sun. ALFRED F. HESS, M. D., J. A. M. A., 84:1033-1037, April 4, 1925.

LONG before the medical man seriously considered the possibility of therapeutic power from any portion other than the visible radiations of the sun, the plant physiologists had laid great stress on the role of the invisible or chemical rays of the sun in the biologic processes of the vegetable world. They had also maintained the power of the invisible rays to destroy bacteria within a period of sixty seconds. It was not, says the author, until it could be shown objectively in man and in animals, by means of the roentgen ray and by chemical analyses of the blood, that a nutritional disturbance—rickets—came about as a

result of a lack of the ultra violet solar rays, and could in turn regularly be prevented or cured by these irradiations, that their importance in physiologic and pathologic processes was fully appreciated.

The amount of these rays emitted occupy a comparatively small portion of the solar radiations, constituting less than 1 per cent. This fact the author applies to the law of vital importance of the minimum—those rays, which are furnished in smallest amount and in least intensity, are nevertheless indispensable.

The action of these rays is particularly important from a therapeutic standpoint. They possess such an exceptionally small power of penetration that the dust or moisture of the atmosphere absorbs the shorter ultra violet rays, the mist and smoke interfere with their passage, and window glass completely filters them from the other radiations. The physiologic action of the rays is not yet fully established, although experimentation has revealed the following facts: 1, Formation of the pigment of the skin is due to the ultra violet part of the spectrum; 2, The invisible rays lead to an increase of the lymphocytes in the blood, an observation that is of interest in connection with their curative action in infections of the lymph glands; 3, Rabbits exposed to the ultra violet rays of the mercury vapor lamp cause a hypertrophy of the parathyroid glands—a reaction that calls to the mind of the author the intimate association of the parathyroid glands to tetany and, in turn, the remarkable seasonal incidence of tetany and its well known response to ultra violet therapy.

The index of activity of the ultra violet rays is the biologic response of rickets. Rickets is characterized by a disturbance in the phosphorous metabolism, which is manifested by an alteration in the structure of the bones and a diminution of the inorganic phosphorous or of the calcium of the blood. Both of these abnormal states are rectified when the infant or animal is exposed to the sunlight or to the ultra violet radiation from an artificial source. An indirect action has also been demonstrated by the author by imbibing by exposure of leafy vegetables and vegetable oils an antirachitic power.

"Strictly speaking, the broad statement that ultra violet radiations prevent or cure rickets is incorrect." This startling statement is explained by the fact that all rays shorter than 400 millimicrons are designated as ultra violet, while the therapeutic potency includes only a small band of radiations that extend from about 313 millimicrons to 297 millimicrons. Furthermore, the visible rays seem to impinge upon the invisible rays, thereby minimizing their action.

There are marked diurnal and seasonal variations in the ultra violet portion of the spectrum. The ultra violet rays are weak in the early morning and evening and of greatest intensity between the hours of 10 a. m. and 1 p. m. Their antirachitic value is greatly minimized in the winter.

The question as to the dominant factor in relation to the activity of solar ultra violet rays is difficult to determine. An analysis of the sunshine in some of the largest cities in the world brings the following conclusions: 1, The incidence of rickets and its seasonal variation cannot depend on the number of hours of actual sunshine; 2, The amount of actual sunshine seems to have no direct influence on the prevention of rickets; 3, The equable distribution of sunlight throughout the year does not play a determining factor. The dominant factor in relation to the activity of solar ultra violet rays is not the quantity, but the quality of the rays. Where the zenith distance of the sun has a smaller annual fluctuation, there the antirachitic value is greatest.

The means of combating rickets is of particular interest to the practitioner. "For the last few years, I have been attempting to prevent and to cure rickets during the winter by means of heliotherapy. The infants have been exposed to the sun for as long a period and to as great a degree as was feasible in this climate. The results have not been all that might be desired. Although some benefit was brought about by this treatment, I found that it could not be relied upon to prevent or to cure rickets.....It would seem that the amount of effective solar radiations is so small in the winter that even if we substitute quartz panes for ordinary window glass, it will be insufficient to afford protection and eradicate rickets. The most promising prophylactic measures are ultra violet light from artificial sources or the use of cod liver oil, or potent extracts of this oil. Possibly foods that have been activated by irradiation will prove to be of value in this connection; for example, dried milk that has been rendered antirachitic by this means."

Actinotherapy. Editorial J. A. M. A., 84:1670-1671, May 30, 1925.

EDITORIALLY, attention is called to the limitations of natural sunlight. It is recalled that Hess, in a careful analysis of the ultra violet rays emitted from the sun, demonstrated that there is no close parallelism between the incidence of rickets and annual sunshine. In his opinion the value of heliotherapy depends not upon the quantity of sunlight, but upon the quality of the rays emitted. The application of the sun's rays to rachitic children during the winter months has been very unsatisfactory, due to the poor quality of the rays and the deficiency in amount caused by the severity of the climate. "It should no longer be difficult to protect children from rickets; and, as antirachitic action consists in the induction of calcium assimilation and its conservation, this is a matter that concerns not only the young, but also the adult, particularly when large physiologic demands are made on the latter in pregnancy and lactation."

Rickets. L. R. De Buys, M. D., Illinois M. J., 47:413-420, June, 1925.

IN this paper, Dr. L. R. De Buys of the Department of Pediatrics at the University of Louisiana Medical College concerns himself with exposition on the history of the study of rickets.

After a preliminary history of the age of the disease, its realization and its medical labeling, the etiological factor of the disease is exhaustively considered, citing the results of the work of numerous writers.

The alteration of two chemical elements, phosphorous and calcium, has been the source of much experimentation.

Dietary insufficiencies have been found to be important accompaniments of the disease, and have led to much experimentation until Hess and Unger demonstrated that rickets is encountered occasionally when every kind of food is given without exception. They also found it to occur in one-half of the breast-fed infants of the poor, while De Buys has noted the disease to occur to an appalling degree in those infants exclusively breast fed. It would seem that since the disease occurs with such frequency on a diet supposed to be ideal, that either one of two reasons or both must be given, namely, that breast milk is deficient in the antirachitic factor or factors contained in food or that something additional is necessary to exert a favorable protective influence.

Sunlight has been proved to be one of the favorably influencing factors in the prevention of rickets. The disease is notably frequent in parts of the world where the amount of sunlight is relatively little as compared to other parts where the sunshine is plentiful. It was Huldschinsky who in 1920 first instituted systematic attempts at the treatment of rickets with artificial ultra violet light and reported favorable results. Hess and Unger, in 1922, magnified these experiences and reported the use of the carbon arc light in the prevention and cure of rickets.

And the work is but yet young. With the active corps of experimental workers of the highest calibre studying over this deficiency disease, we may expect further startling findings.

Breast Milk and Rickets. Editorial J. A. M. A., 84:372-373, Jan. 31, 1925.

ATTENTION is called to recent experimental observations that have resulted in the fact that rickets can develop irrespective of the diet. This includes the various milk mixtures and all other foods. It has also been noted that rickets can develop in babies purely breast fed. In attempting to determine the etiological factor here, analysis of the milk was repeated by numerous observers. The average calcium content of the milk in white races was 31 mg. per cent, while that of negro women was 25 mg. per cent, an interesting observation in view of the fact that in the cities rickets is prone to develop among negro children. In the breast milk of healthy country village women, a relatively high phosphoric acid content was found compared to the lime. It seems that the deficiency of calcium cannot be the only cause of rickets. The subject of sunlight has been disregarded, but other writers mention the facts that the disease is rare in Italy, yet the Italian population in our eastern cities has a large incidence. Again, the disease is practically unknown in Africa, yet it is almost universal in the colored children here. The native races in the warm climates live almost wholly on fruits and milk. Their diet is not altered so materially here, but their sunlight exposures are enormously reduced.

The Physiological Effects of Radiation—the Electromagnetic Spectrum. W. T. Bovie, Ph.D., Boston M. & S. J., 192:1035-1037, May, 1925.

THE writer reviews the classical experiment performed at the State University of

Maine, using a clutch of 250 chickens divided into three groups. The first group run outside in the open sunlight; the second group were exposed to the rays of the mercury vapor quartz lamp for twenty minutes each day; the third group remained inside a green house, so that they received only the sunlight which passed through the glass roof. All chickens received the same food and roosted in the green house. Groups one and two developed normally, while group three's development was markedly retarded.

The object of the author, after relating this experiment, is to offer its explanation. This he does both graphically and descriptively. Using the meter as his unit, he lays out minute divisions, each representing the unit to the right multiplied by ten. To reach the greatest distances that the human mind conceives, only from 17 to 22 places to the left or 12 places to the right of the same point are necessary. On the left or positive side, wireless waves occupies space three ciphers from the zero point; light seconds, 9 ciphers; light years, 17; unknown, 23 ciphers. Planets occupy the space between light-seconds and light-years, while the distance of the stars occupy the space between 17 and 21 ciphers. On the right or negative, heat waves occupies the decimal space, 5 ciphers; light waves, 7 ciphers; roentgen and gamma rays, 11 and 12 ciphers, respectively.

Recharting the space seven ciphers to the right of zero occupied by light waves, the author lays off the electromagnetic spectrum into ten equal parts. Ultra violet rays occupies the space from 0 to 4; visible rays, from 4 to 7, and infra red rays from 7 to 10. The rays that pass through ordinary glass are demonstrated at 3 and sunlight falls at 2.9. All rays that fall below three cannot pass through window glass, and all rays that fall below 2.9 are not contained in sunlight. The rays emitted by the quartz mercury vapor arc occupy space graphically illustrated at 1.8.

"It will be seen that there is a very restricted range of wave lengths in the sunlight ultra violet that is not transmitted by glass, and further, in comparison with the length of the visible spectrum this restricted range of wave lengths may be described as a monochromatic band lying at the extreme end of sunlight. The narrowness of this band is, however, no criterion of its physiological effects.

"Since in these experiments chickens grew and developed normally in full sunlight and since they did not grow and develop in a normal manner in light transmitted by glass, it is evident that chickens, at least, are virtually dependent upon this narrow band of the ultra violet.

"The clinician should be interested in these experiments because it has been shown that important physiological processes in growing children are influenced by light lying in this same narrow spectral band."

Long Light Waves Are Bactericidal. Editorial J. A. M. A., 85:379.

A STUDY of the bactericidal action of ultra violet rays has been made by the Bureau of Standards, Department of Commerce, covering a range of wave lengths from just beyond the limit of the visible spectrum down to the shortest wave lengths emitted by a mercury vapor arc in a quartz lamp. The shortest waves, when sufficiently intense, were found to produce death with an exposure of only one second. Longer wave lengths required a greater intensity and acted much more slowly; but a killing action was found to result even from waves as long as 365 millionths of a millimeter, which is almost as long as the shortest waves visible to the human eye. Prior to this experiment, doubt had been expressed regarding the ability of these longer waves to kill bacteria. *Bacillus colicommunis* was used in the tests. The bacilli were put in a large volume of water, some of which was sprayed on Petri dishes. A quartz mercury vapor lamp was used as the source of ultra violet rays, screens being interposed to cut off successive spectral ranges of the wave lengths. Rays of sufficient intensity killed bacteria with an exposure of less than one second, using a 220 watt mercury lamp, at a distance of six inches. When the intensity was very low, the killing action was retarded. In some experiments an exposure of seventy-five to eighty seconds was required. On still lower intensities there was some indication that the bacteria were stimulated instead of being killed. In tests made to compare the relative value of continuous and intermittent exposures, it was found that the killing effect was in proportion to the total exposure, whether this was given all at once or divided into several short exposures with periods of rest between.

THERAPEUTIC APPLICATIONS

RICKETS

Sunlight for Babies. MARTHA M. ELIOT, M. D. Child Health Bull., 1:35-38, June, 1925.

TRADITIONS play a great part in the shaping of babyhood. It has developed as an unwritten law that babies are delicate and that they must be safely guarded and protected against sunlight. But if we are to have healthy babies, sunlight is a necessary medication.

The author suggests exposure of sunlight a great deal on the same principle used by Rollier. She suggests that the sun baths be begun when the baby is from three to four weeks of age. The exact date when sun baths should begin vary with the latitude and the season. With the first sunny day in early spring, the baby may be put in the direct sunlight, with both the hood of the carriage and the baby's cap pushed well back so that the sun will shine directly on the cheeks. The baby may be turned on one side and then on the other, so that both cheeks may be exposed and yet the eyes will be kept away from the direct rays of the sun. On the first day only the hands of the baby should be exposed, care being taken not to burn the tender skin. Allow the sun bath to continue until a slight erythema is produced. The first sun bath should not exceed ten to fifteen minutes' exposure. Soon a light tan will be produced. Each day thereafter the exposure should be increased from three to five minutes until the baby lies directly in the sun one hour in the morning and one hour in the afternoon. This should be done in the early forenoon and late afternoon before the heat rays are too plentiful.

These sun baths should begin about March or April and the baby will become accustomed to the sun baths until, in about the middle of June, the whole body will be exposed. Care should be taken to avoid the extreme heat in middle of the day in the months of July and August. Exposure should be done before ten o'clock and after three o'clock. A good tan color is evidence that the ultra violet rays are being effective.

"In the colder latitudes of the north temperate zone it is not possible to expect mothers to give outdoor sun baths to their babies between the middle of November and the middle of March. In extremely cold weather many people think that babies cannot be put outdoors at all. It is rarely appreciated that, on a cold day in winter when the temperature in the shade is only 20 degrees Fahrenheit, the temperature in the sun may be fifty or sixty degrees higher. If a baby is placed directly in the sun and is protected from the wind, the heat from the sun can be used to keep him warm."

Effects of Radiations of Cod Liver Oil. I. A. MANVILLE, M. D., J. A. M. A., 84:1401-1403, May 9, 1925.

RICKETS are known to be curable by cod liver oil, egg yolk and other naturally occurring foodstuffs. Radiations from ultra violet light bring about the same result. For this reason any of the experiments carried on and proved for cod liver oil are also applicable to ultra violet radiation. In 1923, Park, Powers and Guy made the statement that the similarity between the action of cod liver oil and that of radiant energy in rickets is so close that a connection must exist between them. The author presents some further interesting information.

"Besides the action of cod liver oil in curing or preventing rickets, we are led to conclude from the foregoing that there are two other specific actions: (a) There is a stimulation of cell activity and a distinct inhibitory effect on bacterial growth; (b) when these active principles are in excess of the amount producing stimulation, there is exerted a depressing action, the most striking manifestation of which is a lack of fertility. The separation of fat soluble A into two vitamins, each with a specific action, does not seem justified when the effects can be explained as being due to different concentrations of the same principle."

Light and Nutrition. Editorial J. A. M. A., 84:1574-1575, May 23, 1925.

THE marked advance in the science of nutrition and the analysis of the actions of light on the body is considered. The ultra violet rays and cod liver oil in the prevention of ricket formation are supposed to act in some unknown manner as regulators of mineral metabolism, at least so far as calcium and inorganic phosphorus are concerned. It matters not whether the substances are activated before ingestion or whether they are activated after they enter the body. It seems that the activation produced by irradiation of the body by the ultra violet light or by sunlight, or by the ingestion of cod liver oil does not result in the establishment of new processes, but rather permits the organism to assume full power of the processes already in operation.

The manner by which this activation is brought about has recently been fairly well

established by Hess. Experimenting with the activation of cholesterol and phytosterol, Hess has demonstrated their activation and transformation into antirachitic substances. Other foods which are naturally inactive in the alleviation of rickets have been transformed into antirachitic substances by the action of the ultra violet light. These works demonstrate the linking up of light with food factors and nutrition—a triumph of present-day biochemical research.

TUBERCULOSIS

The Administration of Natural and Artificial Sunlight in Private Practice. J. A. Myers, M. D., Minnesota M., 8:362-368, June, 1925.

AFTER a careful review of the literature showing the progress of heliotherapy in the treatment of disease, the author demonstrates by case reports its practicability and illustrates some of the methods whereby it may be employed.

"I desire to make it clear that I do not believe heliotherapy is in itself sufficient in the treatment of any case of tuberculosis. However, when carefully administered with the other therapeutic procedures indicated in each individual case I have found it of tremendous value. I have become thoroughly convinced that heliotherapy has a four-fold value—First, it acts as a tonic. It has been shown to change the blood picture in probably the blood chemistry in a manner favorable to the patient. Second, it induces the patient to rest quietly while the exposure is being made. When the periods of exposure are long this period of rest becomes an important factor in the treatment of the patient. Third, in addition to the sun bath, the patient gets an air bath, which is of unquestionable value. Fourth, it is a tangible form of treatment—the patient sees the skin becoming pigmented and feels definitely improved from time to time. Not infrequently by the administration of heliotherapy it is possible to keep a tuberculous patient on the dietetic and hygienic treatment for months after all treatment would otherwise be abandoned. Therefore, the physician who employs heliotherapy will be able many times to secure an arrest of the tuberculous process and a restoration of the working capacity, whereas without heliotherapy no better than a condition of quiescence could be secured."

The Life Ray of Modern Science. G. J. Warnshuis, M. D., Clin. Med., 32:388-381, June, 1925.

THE writer reviews briefly the literature on the activity of the sunlight and discusses its application to therapeutics. Mention is made of the use of ultra violet light in the treatment of the various deficiency diseases, referring to the work of Hess and Steenbock on the activation of the various fats. Discussion is also made on the use of heliotherapy in the treatment of tuberculosis. Case reports accompany the article.

OTOLARYNGOLOGICAL DISEASES

Ultra Violet Light Therapy in a Few Nose and Throat Diseases. A. B. Middleton, M. D., Illinois M. J., 47:368-371, May, 1925.

AFTER considering the underlying physical principles pertaining to the formation of the ultra violet light, a discussion of its action is carefully given. The ultra violet rays are, in the words of the author, chemical rays, and have a definite chemical action. "If a mixture of carbon dioxide and water is illuminated by the light of a mercury arc in a tube of pure silica, the light, being particularly rich in ultra violet rays, the mixture quickly develops oxygen carbon dioxide, carbon monoxide, formaldehyde and hydrozen peroxide."

In otolaryngology, the ultra violet light plays an important role. Old, chronic, discharging ears are cured with ultra violet rays. In these cases the organisms are destroyed in a short period of time, the red blood cells absorb the rays, which charged them with oxygen formaldehyde, and they are distributed to every part of the ear. Toxins are destroyed in the same manner that germs are destroyed. Acute frontal sinusitis responds quickly, recovery taking place without operative interference; and acute rhinitis, that stinking nose disease, sweetens up under irradiation, but must be treated once a month. Hay fever patients receive immediate relief and are troubled but little if irradiated once a week.

Acute tonsillitis fades away quickly following irradiation. In place of tonsillectomy, "radiation meets both the positive and negative requirements of the situation more adequately than any other procedure at the present time. Its advantages are:

1. None of the contra-indications to tonsillectomy have any deterrent influence on radiation. On the other hand, patients in whom sur-

gery is contra-indicated can be safely treated with radiation.

2. The disagreeable and oftentimes serious after results of tonsillectomy are entirely absent in radiation. This exemption includes shock and depressant effects, which always immediately follow the operation. Radiation improves the patient's general health and resistance from the first. This is one of the earliest noticeable effects of the treatment.

3. Radiation reaches not only the tonsils themselves, which are but a portion of the infected tissue, but all of the adjacent and surrounding lymphoid tissues of the pharynx and lingual areas, cleaning up the entire seat of infection, and thus does actually solve the problem at issue, producing systemic results for which the treatment is undertaken.

4. Radiation removes only the infected lymphoid tissue, leaving the harmless and useful fibrous structures intact, and cannot possibly produce any scar tissue or throat deformity."

In closing, the author requests that it be borne in mind that ultra violet light rays produce nothing more than a chemical change, charging the red blood corpuscles with oxygen formaldehyde. This powerful disinfectant kills germs, breaks down toxins, restores the blood and cellular tissue to a normal metabolism.

ORAL DISEASES

Actinotherapy Applied in Dentistry. A. L. Parsons, D. D. S., Dental Cosmos., 67:612-614, June, 1925.

SUNLIGHT has been used with wonderfully beneficial results in such conditions as tuberculosis and rickets, but not much mention has been made of its application to dentistry. The author notes this point, but predicts for actinotherapy its becoming "a very important factor in the treatment of many of the complications" encountered in dentistry.

"Post-operative pain, gingivitis, stomatitis, pericementitis, pulpitis, spongy, bleeding gums, pyorrhea alveolaris, trench mouth, hypersensitive dentin, alveolar abscesses, are all very successfully treated by actinotherapy, the penetration of the short ultra violet wave leukocytosis, thereby raising the tissue vitality. One peculiarity about this treatment is the fact that the actinic wave is entirely absorbed by the blood and a good action can only be obtained by dehematizing the area either by pressure, cocain, novocain or adrenalin. Pus will also block the penetration of the wave and must be removed before a perfect action can be obtained."

To illustrate these facts, the author presents numerous case reports.

CANCER

Cancer and the Sun. Frederick Bryant, M. D., Boston M. & S. J., 192:1203-1206, June, 1925.

THE writer considers cancer as a disease that is devastating mankind, having an unknown etiological factor, a multitude of exciting causes in civilized life and customs, but possessing earmarks of a disease that has advanced and is continuing to advance with modern civilization. He considers the theory of J. Ellis Barker on the cause of cancer and its prevention. As man has become civilized, cooked his food so as to destroy its vitamins and lower his resistance, clothed his body so as to almost completely shut out sunlight, and has become constipated, the author, reviewing the observations made by many of the leading medical men, concludes that the modern mode of living for the most part is responsible for the role that cancer plays.

A return to more primitive, natural living is the great essential in the twentieth century program of cancer prevention. In order to maintain vigor and the characteristics of youth, one must evacuate the undigested contents from the intestine before extensive absorption of the products of protein decomposition can take place, and that such a diet must be made up mainly of milk, dairy products, the leafy vegetables, whole-wheat bread and fruits. Everything that is edible in a raw, fresh state should be used as such. One should also live out of doors and exercise with the body exposed as much as possible directly to the sun. Sleep on the porch, veranda or balcony. Live extensively from food from the garden of your own cultivation.

The modern problem is the treatment of the cancer when it does come. For this the author advises the application of surgery and short wave length radiation. This combination is giving a decidedly better outlook in the treatment of this dreaded disease. The author recently visited the Curie Foundation of the University of Paris and watched the scientifically prepared and skillfully administered radium. "I was impressed with their conservative methods in the employment of fractional, rather than massive, lethal doses. With both radium and the roentgen ray, small-

er doses for longer periods prevailed, as opposed to the larger doses for shorter periods. For instance, I saw a small amount of radium removed from a growth which had been in place for five days." At the Rollier Clinic in the Swiss Alps, and at the Finsen Institute, under Dr. Reyn, in Copenhagen, the author was impressed with the results obtained from the sun's rays in their application to tuberculosis. If the sun will produce such astonishing cures in surgical tuberculosis, he argues, why is it not logical to give it a tryout in cancer which has some points, at least, in common? "I expose the local lesion to the 'sun lamp' until a chocolate-brown tanning is produced. Following such exposures, much more roentgen ray intensity can be endured by the skin because of the protective tanning. In case of overdose, the 'sun lamp' accomplished a neutralizing effect.....This combination of the sun and the shorter wave lengths clearly tends to assist nature. Remembering McCarty's findings, we note that the sun increases leukocytosis, which elevates at once the resistance of the surrounding tissues. The roentgen ray and radium stimulate a definite connective tissue encapsulation, while at the same time the vulnerable rapidly dividing cancer cells are destroyed."

The most promising hope of the time, for the treatment of existing cancer, according to the author, is the radio-surgical combination, which is a wise unbiased selection of those methods which have given the best results in both the old and the new surgery.

CUTANEOUS SYSTEM

Ringworm of the Scalp. Hiram E. Miller, M. D., Calif. & West. Med., 23:313-316, March, 1925.

IN establishing the diagnosis it is necessary to differentiate the disease from alopecia areata. The bran-like scales, the stumps of hairs and the localized areas of alopecia in a young subject are always more than suggestive. Microscopical examination of the stumps of hairs should always be done to make a positive diagnosis. When the clippers are run over the scalp, many smaller areas are found that could not be seen before the hair was clipped. If one area is to be treated, make that exposure correspond to one of the five Kienbock-Adamson areas, so if further treatment is necessary the other four areas may be used.

It is the contention of the author that the x ray treatment of ringworm is only a mechanical process. The spores and mycelia are unaffected by the roentgen ray. The roentgen ray causes the hair shaft to fall from the hair follicle in from fifteen to twenty days after exposure. In this way it removes the millions of spores and all of the hair in which they may live.

If there has been any local applications made, such as mercury, iodine, sulphur, etc., a period of a week to ten days should elapse before radiation. Then the hair should be cut close to the scalp to facilitate correct measurement and not filtration action.

The scalp is then marked off into the five Kienbock-Adamson areas, and one Holzknecht unit of unfiltered radiation at skin distance is given over each of the five areas. The entire procedure is carried out in a period of from twenty to thirty minutes. The hair falls out within two to three weeks following treatment. All of the hair may not fall, but the diseased hair falls or enough defluviation takes place to obtain a good result. The hair begins to return immediately and a good growth is present in from three to four months.

The treatment following the radiation that is advocated by the author is very simple. The children are provided with cloth caps, which are to be worn under the regular head covering. In this manner they can be changed daily or biweekly and boiled before using. At the end of the second week a 3 per cent ammoniated mercury ointment is used to massage the scalp to prevent reinfection.

In conclusion, "I wish to call attention to the marked increase in the prevalence of ringworm of the scalp, to roentgen ray therapy as the best and quickest way to a permanent cure and to the comparative safety of this procedure if all details of technique are carefully carried out."

The Value of Postoperative Irradiation in Mammary Carcinoma. Wm. A. Evans, M. D., and T. Leucutia, M. D., Am. J. Roentgenol., 13:415-419, May, 1925.

THERE is a beneficial action of the roentgen rays in the postoperative stage of carcinoma. A local tissue reaction is produced by the irradiation which brings about immunization against carcinoma.

It is essential that the dose should be within the limit of the tolerance of the normal

tissues—it should not, according to the author, exceed 100 per cent S. U. D.

A destruction of the protective normal tissue around the lesion will produce aggravation of the disease.

The Surgical Treatment of Cancer of the Breast. E. Starr Judd, M. D., Am. J. Roentgenol., 13:411-414, May, 1925.

AFTER a consideration of the question of diagnosis, gradation of malignancy and treatment of same, the author presents the following conclusion:

1. Progress in the development of the surgical treatment of cancer of the breast is being made through a better understanding of the clinical and pathological aspects of the types and grades of cancer.

2. That cancer originates in a single focus is probable; the avenues of its extension from the mammary gland are well understood.

3. A radical operation, in which the adjacent fascia, muscles and lymphatics are removed, is essential in all operable malignant cases, but in spite of this procedure there will be early recurrences in certain apparently favorable cases. On the other hand, many patients in whom the disease is obviously extensive will remain well.

4. In estimating the result of treatment of cancer of the breast it is obviously necessary to take into consideration the type and grade of malignancy dealt with. In a series of cases, in which the type of malignancy is of low grade, the results are sure to be better than in one composed almost entirely of highly malignant cases.

5. There is very good evidence of the beneficial effect of radiotherapy alone in certain cases, including those in which recurrences have followed surgery, but there is every reason to believe that some combination of surgery and radiotherapy can be found which will do more than either one alone. If careful observations are made, they should lead, in a few years, to an accurate estimate of the combined treatment.

GENITO-URINARY SYSTEM

Some Major Urologic Considerations. Louis D. Smith, B. S., M. D., Illinois M. J., 47: 442-447, June, 1925.

THE author is to be commended upon the arrangement and presentation of the subject of urologic diseases. To the specialist or general practitioner who is interested in a broad understanding of the human body as a co-ordinated unit, this article offers a valuable outline of urologic problems adequately considered from the viewpoint of symptomatology, diagnosis and treatment.

Under the subject of symptomatology, hematuria, frequency, dysuria and pain are carefully considered as the results of various pathological changes. Diagnostic considerations include cystoscopy, x ray, blood chemistry and urinanalysis. Therapeutically, bladder conditions, ureteral conditions and kidney conditions are briefly and individually discussed.

Being interested particularly in the subject of the use of x ray in urology, we can do no better than to quote from that portion of the article: "As a diagnostic aid in urology, the x ray is an indispensable adjunct. With proper preliminary preparation and good technique, the kidneys can be usually outlined. An enlargement of the kidney enlightens us as to possible new growth, infection or obstruction below the level of the kidney or pelvis. Malformations and displacements may be thus detected. An abnormality visualized by means of the x ray may put one on the right track for further extensive investigations, especially in the absence of sufficient symptoms. Regarding calculi, we can expect a shadow in about 90 per cent of cases. The phosphate, oxalate and carbonate stones are visible, whereas the urate and uric acid stone can at times be made so.

"While on the subject of stone shadows, it is worth while emphasizing the importance of localizing the concretion. Phleboliths and calcified glands, bowel concretions and gall stones should be excluded. This can be readily done by the use of shadowgraph ureteral catheter, which may be halted by a ureteral stone or passing in the same plane as the stone. A picture showing a stone, possibly in the bladder, must certainly have a cystoscopic for verification. Stones that do not show on the film may be visible by the injection of shadowgraph solution through the ureteral catheter, an item that still further reduces the chances of missing concretions by x ray.

"The pyelo-ureterogram, which means a picture of the ureter and pelvis made visible by the injection through a catheter placed low in the ureter of some opaque fluid, such as sodium bromide 25 per cent, sodium iodide 15 per cent or 12 per cent sodium mercuric iodide, enable us to determine, as before-mentioned, calculi kinks and strictures of the ureter, tu-

mors of the kidney and pelvis as evidenced by filling defects of the pelvis, hydroureter and hydronephrosis due to obstructions. We must first of all be acquainted with a normal to recognize the abnormal. We must first be cognizant of the fact that the normal pyelogram exhibits three major calyces, superior, middle and inferior, with various branches; that the papillæ are concave and regular. We must also recall indetermination of the ureteral strictures and normal peristalsis of the ureters, which may easily be confused with structures of the portion exhibiting the contraction. This has given rise to dissentions from Hunner's opinions. It is difficult to accept the frequency of such findings, and yet more and more of us are falling into line with Hunner. We must remember the three natural narrowings of the ureter, namely, the vesical portion, that part that crosses the iliac vessels at the pelvic brim and the pelvic ureteral junction."

What the General Practitioner Should Know of Radium in Gynecology. GEORGE GELLHORN, M. D., F. A. C. S., 15:200-202, April, 1925.

WITH the sole object of demonstrating to the general practitioner that which can be accomplished with radium, so as to enable him to give intelligent advice to his patients, the author considers its applicability.

The principal field for radium in diseases of women is in the treatment of fibroids and cancer of the uterus. If properly applied, radium will check the bleeding in practically every case of fibroids and will cause a more or less complete shrinkage of the tumor in 80 or more per cent. This action is brought about in three ways: 1, Performing a bloodless castration by exerting a deleterious effect upon the follicle cells of the ovaries; 2, causing nuclear degeneration of the tumor cells; and 3, by inserting into the uterine cavity radium, which causes a burn of the endometrium, thereby sealing the source of bleeding.

The indications for the use of radium are included in the following quotation: "Generally speaking, women of forty or over, with fibroids of small or moderately large size—let us say, extending not higher than to the umbilicus—are the best subjects for radium treatment; and it will occur to you at once that, proportionately, this is the category of cases you see most frequently. Then there are the patients with 'poor surgical risk' who, irrespective of age, do better under radium—the anemic and exsanguinated kind, those with high blood pressure or cardiac and renal complications, the women with pulmonary tuberculosis and other respiratory ailments, and finally, the obese, whom no surgeon likes. Add to this class the women who will not submit to an operation under any condition, and you have a rather large percentage of cases—I should say, around 60 per cent of all fibroids—that may successfully be treated with radium."

The contra-indications may be realized when one considers the action of the radium noted previously; 1, Younger women, in the second or third decade of life, should be considered surgical, so as not to produce a premature menopause; 2, all gigantic fibroids and the large pedunculated ones should be operated upon, for radium is apt to produce necrosis; 3, for the same reason, degenerated fibroids are unsuited for radium; 4, cervical fibroids require operation, for they do not respond to radium; 5, in tubo-ovarian inflammations it is unsafe to apply radium; and 6, radium should be used when there is any question as to the diagnosis.

The other condition in which radium is used is cancer of the uterus. Because of the small amount of resistance of the cancer cells, the incessant bombardment of the high velocity rays which emanate from the radium rapidly causes their destruction. Normal cells are also injured, but these usually recover. For this reason, radium is the ideal palliative treatment in inoperable cancer of the uterus. In the far advanced cases of inoperable cancer of the cervix, the author advocates the acetone treatment to supplant the radium applications. In the less advanced and early cases, pre- and post-operative application of radium has found a legitimate place and enhances the chances for permanent cure.

In the hemorrhage of a preclimacteric and adolescent nature, microscopic uterine scrapings should be made to determine the presence or absence of malignancy. If nonmalignant, radium is the sovereign remedy, from the viewpoint of promptness, convenience and safety. In juvenile hemorrhage, radium is seldom indicated.

There are also some forms of cervical discharge, pruritis and condylomata acuminata that radium has proved beneficial.

Cancer of the Uterus. W. R. Brooksher, Sr., M. D., F. A. C. S., J. Arkansas M. S., 22: 6-9, June, 1925.

IT is the contention of the writer that surgery has no place in the treatment of malignancies of the uterus. Supporting his argument, he states that W. J. Mayo, in a personal communication, stated that he had not personally performed a Wertheim operation in three or four years. "In fact, no surgeon of prominence today employs surgical methods in these conditions, if it is probable that the disease has invaded the structures outside the uterus; but they recommend radium supplemented by deep x ray therapy."

The author is radical on the use of radium, stating that in the treatment of malignancies of the uterus he uses proper radiation, "and by proper radiation I mean a sufficient quantity of radium, in most cases at least 100 milligrams at a proper distance, properly screened, for a sufficient length of time. I do not believe that the x ray has any but a supplementary function in treating cancer of the uterus, and should not be relied on to the exclusion of radium in any case. I am fully aware that in taking this radical stand against surgery in this condition, I am against practically the solid opinions and practices of the surgical world today. All of them recommend surgery when the body of the uterus is involved and the growth has not invaded the surrounding structures.....Since this statement was written, I have received a personal communication from Ochsner, stating that at present he is referring all his cases of uterine cancer to the radiologist for radium and x ray therapy, and I am confident that time will vindicate my position."

BOOKS RECEIVED

The Advance of Orthopaedic Surgery. By A. H. Tubby, C. B., C. M. G., M. S. Lond., F. R. C. S. Eng., F. S. A., Colonel, R. A. M. C. (Retired) and formerly Consulting Surgeon, Mediterranean and Egyptian Expeditionary Forces; Consulting Surgeon to the Westminster, Royal National Orthopaedic, Evelina and Christ's Hospitals; Member of the International Society of Surgery, of the Societe Francaise de Chirurgie, of the Societe de Chirurgie de Paris, and of the British Orthopaedic Society, etc. Cloth. Pp. 144, with 31 illustrations. New York: Macmillan & Co., 1924.

Electrotherapy and Ionic Medication. A technical and clinical compendium expressly written to meet the needs of general practice. By Harold H. U. Cross, Ph. D. (Med.), Formerly Research Worker at the Stanford University, Calif.; Author of *Electro-Physics of Ionic Medication*, etc. Cloth. Pp. 253, with 155 illustrations. Philadelphia: J. B. Lippincott Company, 1925.

Goiter: Nonsurgical Types and Treatment. A monograph on goiters curable without surgery. By Israel Bram, M. D., Instructor in Clinical Medicine, Jefferson Medical College, Member of the Society for Study of Internal Secretions, etc. Cloth. Price $6.50. Pp. 479, with 152 illustrations. New York: The Macmillan Company, 1924.

Medical Uses of Radium. Summary of reports from research centers of 1923. Compiled by Medical Research Council, of which the Right Hon. Edward F. L. Wood, M. P., is chairman. Paper. Pp. 34, with 5 illustrations. London: His Majesty's Stationery Office, 1924.

Epitome on Blood Pressure. Aids to the interpretation of blood pressures for the general practitioner, with key to diagnosis. By Burton Baker Grover, M. D. Paper. Pp. 76. Kansas City. Electron Press, 1924.

Diseases of the Heart. By *Dr. Henri Vaquez*, Professor of the Faculty of Medicine of Paris, Physician to L'Hospital de la Pitie, Member of the Academy of Medicine, Paris. Translated and edited by *George F. Laidlaw*, M. D., Associate Physician to the Fifth Avenue Hospital, New York City, Fellow of the New York Academy of Medicine. Cloth. Price $8.50. Pp. 743, with 146 illustrations. Philadelphia: W. B. Saunders Co.

BOOK REVIEW

Concealed Tuberculosis, or *"The Tired Sickness."* A clinical study upon the exhaustion type of hidden tuberculosis infections. By George Douglas Head, B. S., M. D. Cloth. Price $2.00. Pp. 137, with illustrations. Philadelphia: P. Blakiston's Son & Co., 1924.

Head has long since been recognized as an authority on tuberculosis. His numerous writings on the subject of "concealed tuberculosis" has attracted wide attention. The book here presented is an able monograph of the subject.

It is evident that the author considers the majority of the cases labeled as neurasthenics, as well as the patients suffering from other forms of exhaustion not organically explained and those with lowered vitality, as tubercu-

losis. This insidious tuberculous infection fails in its manifestation of the characteristic clinical symptoms because of the high degree of resistance that has been developed by the patient. "Tuberculosis, like its great rival, syphilis, presents itself in a variety of clinical pictures. One of its peculiarities is the tendency which it often manifests to invade its host without causing much constitutional or local reaction and without producing pronounced symptoms indicative of its presence. This reaction on the part of the organism is often expressed in terms of unstable physical force and nerve-exhaustion and not the recognized clinical picture too often considered as a '*sine qua non*' in order that a diagnosis of tuberculosis shall be made."

In the consideration of the causative factor of a lowered vitality, a constant wornout feeling, an unstable nervous system, an exhausted physique—after a complete history has been taken, a physical examination made and the routine laboratory work completed, the examining physician usually requests a Wassermann to rule out the possibility of lues, but fails to request a tuberculin reaction, fully as specific a test, in the mind of the author, of the presence of latent tuberculosis. "The proof that the patient harbors a tuberculous infection rests upon the specific test, just as in latent forms of syphilis the presence of the infection rests upon a positive Wassermann reaction, either in the blood or spinal fluid.... for....postmortem and clinical experience has proven the reliability and specificity of a positive subcutaneous tuberculin test as proof of the existence of an active tuberculous infection." In selected cases the tuberculin test is considered sufficient for diagnosis.

No time, space nor effort is spared by the author in elucidating the subject. In the first portion of the text great care is taken to depict the clinical picture presented by those suffering from this disease and presents his method of eliciting the history, making the physical examination and arriving at the diagnosis. The second chapter is devoted to a discussion of the variation in symptoms, classifying them into a chest pain group, a nervous exhaustion group, a cold and croup group, and an abdominal distress group. This is followed by a consideration of the physical findings that are usually to be found and appreciated. By way of differential diagnosis, there are four conditions to be eliminated: syphilis, myocarditis, gastric or duodenal ulcer and hyperthyroidism. The suggestions given by the author are indeed very helpful. Having arrived at the diagnosis, the treatment that should be instituted for such a patient is given in detail. Instructions that are given the ambulatory case are considered at length and the method of presentation of the malady and treatment to the patient are unsparingly noted. To complete the valuable monograph the author culminates his work with a citation of a group of 30 cases, carefully noting in each case the history, physical and laboratory examinations and the method and reasons which lead to an establishment of the diagnosis.

We are indeed greatly indebted to Dr. Head for such a complete, concise, clear and consistent presentation of his concepts and interpretations of many of the obscure complaints that daily confront a general practitioner. Surely his viewpoint is to be carefully considered and merits the earnest study and most careful attention of all who look forward to an eradication of human ailment.

The Technic of Local Anaesthesia. By Arthur E. Hertzler, A. M., M. D., Ph.D., LL.D., F. A. C. S. Cloth. Price $5.50. Pp. 272, with 140 illustrations. St. Louis: C. V. Mosby Company, 1925.

In the presentation of his subject, the author gives methods which are perhaps not universally recognized, but endeavors to present in each case the method which has been found most useful to him.

After a consideration of the drugs to be employed for local anaesthesia, together with their preparation, physiological action and the methods to be employed for their use, the technique of administration of the local anaesthesia and the preoperative care of the patient are discussed. Under the heading of general operations, such subjects as the opening of boils, removal of tumors, skin grafting and suturing wounds are included.

Regionally the problem of local anaesthesia is discussed, carefully considering the indications and difficulties most likely to be encountered in attempting its use.

In each region under discussion, after a general consideration of the entire area is given, short, clear and concise statements relating to the technique to be employed, the trouble that is apt to be encountered and the means of obviating these difficulties.

Considering first the subject of operations on the head, the author subdivides this large field into many parts. By chapters he refers

to operations on the scalp, cranium and its contents; operations of face, jaw and tongue; operations on the ear and mastoid, and operations of the Gasserian ganglion and the trifacial nerve. The various operations on the tonsils, adenoids, larynx, trachea and thyroid gland are considered only insofar as local anaesthesia is related. The numerous conditions that may receive surgical attention through local anaesthesia on the mammary gland are next discussed, followed by a consideration of the operation on the thorax, lungs and spine. Before referring to the technique to apply on abdominal operations, the author first discusses the indications for local anaesthesia. The subject of hernias is again subdivided regionally into operations for umbilical hernias, hernias of the linea alba and scar hernias, and operations on hernias, referring to inguinal and femoral hernias. The problem of sacral blocking, paravertebral and spinal anaesthesia is handled admirably, simplifying the subject to a remarkable degree. The indications for local anaesthesia for operations on the male genital organs are divided into two parts: operations on penis and scrotum, and operations on the urethra, bladder and prostate. Operations on the female organs are handled in one chapter under the one heading. An all-important subject concerning defects about the rectum are treated in the section on operations about the rectum. The question of operations on the upper and lower extremities are separately considered.

In this text the author confines himself strictly to his subject and handles the subject of local anaesthesia in such a clear and comprehensive manner as to render the text a valuable and necessary reference and study for the practitioner and student of medicine.

Modern Methods of Treatment. By *Logan Clendening*, M. D., Assistant Professor Medicine, Lecturer on Therapeutics, Medical Dept., University of Kansas. With chapters on special subjects by *H. C. Andersson*, M. D.; *J. B. Cowherd*, M. D.; *Carl O. Rickter*, M. D.; *F. C. Neff*, M. D.; *E. H. Skinner*, M. D., and *E. R. DeWeese*, M. D. Cloth. Price $9.00. Pp. 692, with 75 illustrations. St. Louis: C. V. Mosby Co., 1924.

The contents of this text is divided into two parts, the first dealing with general therapeutic problems and the second with specific therapeutic indications.

Part I. General Therapeutics included the various methods used in the treatment of pathological conditions. *Rest* receives the primary consideration, since it is an essential of the successful application of every measure.

The essentials of successful prescription writing, physiologic and chemical action of drugs, methods of administration and their effects upon the various systems, all is considered under the heading *drugs*. H. C. Andersson includes a discussion on anesthetics.

The analysis of *biologic therapy and prophylaxis* includes a discussion on the administration and dosage of the various sera, the theoretical action of vaccines and their indications for use, nonspecific protein therapy and convalescent serum.

An important place in therapy is being assumed by *extracts of ductless glands*. Much is to be learned concerning their use. The author materially aids the practitioner with a consideration of the conditions wherein one may reasonably expect benefit.

The value of *dietetics* is ably handled. Itemization of the diseases requiring its consideration is followed by a discussion of the principles of food chemistry and nutrition, physiology of digestion and an outline of standardized hospital diets. Joseph B. Cowherd considers infant feeding.

Heat and cold, *hydrotherapy*, has its place in therapy. Its physiological action and indications are carefully detailed.

Carl O. Rickter reviews the indications, contra-indications and diseases wherein to apply *medical gymnastics and massage*.

Exercise receives special consideration.

The chapter on *electrotherapeutics* is far too short to be of much value, even to the general practitioner. Only a superficial indication of its usefulness is mentioned.

Radiotherapy does not receive sufficient space. The modes of application, a mentioning of the details of computation of dosage and the indications for application of its measures to diseases by systems are mentioned by E. H. Skinner and E. R. DeWeese.

Under one general heading, *climate, aerotherapy, heliotherapy, mineral springs and health resorts*, much territory is covered. Heliotherapy was given special attention, referring to the work and technique developed by Rollier in the treatment of tuberculosis and to the experimentations that have been carried out on rickets.

Psychotherapy has its place in the treatment of disease.

Transfusion, venesection, lumbar puncture, pneumothorax, etc., are all discussed under *miscellaneous procedures.*

Part II. Special Therapeutics considers the application of therapeutics to particular diseases, subdividing these diseases into *infectious diseases, diseases due to allergy, diseases of metabolism, diseases of the blood, diseases of the cardiovascular system, diseases of the respiratory system, diseases of the kidney, diseases of the digestive system, diseases of the ductless glands.* In this section Frank C. Neff discusses Scorbutus and Infantile Rickets.

The author fulfills the purpose of the text in presenting a comprehensive, well balanced edition on the modern methods in the treatment of disease. This text should be of service not only to the student of medicine as a text on therapeutics or to the instructor as a teaching aid, but should serve the general practitioner as a valuable reference in the determination of the mode and application of the various therapeutic measures.

Practical Medicine Series, 1924. Vol. II, *General Surgery.* Edited by Albert J. Ochsner, M. D., F. R. M. S., LL. D., F. A. C. S., F. R. C. S. Ir. Under the editorial charge of Charles L. Mix, M. A., M. D. Cloth. Price of this volume, $3.00, and of the eight volume series, $5.00. Pp. 706, with 81 plates and 123 other figures. Chicago: Year Book Publishers.

The material considered in this review of the current medical literature that appeared during the year 1923 consists of carefully chosen articles that have been arranged chronologically and are presented in a short, boiled-down form, greatly increasing the value of this little volume to the busy medical man.

Technique in General contains some very valuable abstracted material. The comparative evaluation of the various anesthetics, with a consideration of their indications, contra-indications and technique of application is followed by a discussion of diathermy and radioactivity. This includes radium considered as an adjunct to surgery, and x ray viewed as a diagnostic and therapeutic unit. Many good hints are included on new instruments and apparatus. The necessary precautions for asepsis and antisepsis is concluded by a review of questions of operative technique.

Surgical Pathology includes consideration of not only the subject of wound healing and pathologic interventions, but tetanus and malignant tumors. After a general discussion of the progress in medical knowledge of malignant tumors, their incidence, etiology and treatment receive individual attention. Endothermy, of Dr. G. A. Wyeth, x ray and radium therapy each have their place in the eradication of this scourge.

Blood Vessel, Bone, and Nerve Surgery embodies under the one head arterial and venous pathology, transfusions, the diagnosis by x ray and treatment of osteomyelitis, bone pathology, fractures, joint and nerve injury.

The Head and Face is subdivided into surgical conditions of the scalp and skull, the brain and meninges (including ventriculography and various surgical conditions), the face and mouth (stressing the treatment of malignancies by cautery, x ray, radium and surgery) and the pharynx and esophagus (emphasizing x ray diagnosis of diseases of the esophagus).

The Neck and Thyroid surgery played an important role in the 1923 literature. The application of heliotherapy for the treatment of tuberculous nodes Clark's work with radium on thyroid and other conditions, coupled with the advances made by G. W. Crile, mark an important era in surgery.

The mamma and chest are included under one head, including the diseases of the mammae, chest, pleura, heart and pericardium.

General Abdominal Surgery covers a broad field of pathological conditions that may be embodied under (1) general consideration of abdominal surgery, and (2) peritoneum, mesentery and omentum.

The Gastro-Intestinal Canal is considered anatomically. Under the subdivisions the stomach and duodenum, general intestinal surgery, the small intestine, the vermiform appendix, the large intestine and hernia, the various conditions that are to be encountered surgically are discussed. X ray has proven an aid in the diagnosis, but has had little to offer in the treatment of these conditions.

Liver, Gallbladder, Pancreas and Spleen are next reviewed from the surgical point of view.

The Spine and Extremities are subdivided into three headings, the spine and cord, the upper extremity, and the lower extremity. In this division the principal surgical condition encountered is fracture. Diagnosis and treatment are reviewed at length.

This volume, constructed so as to give the reader the cream of recent literature on surgical subjects, should prove valuable to the physician whose desire it is to keep abreast of surgical achievement.